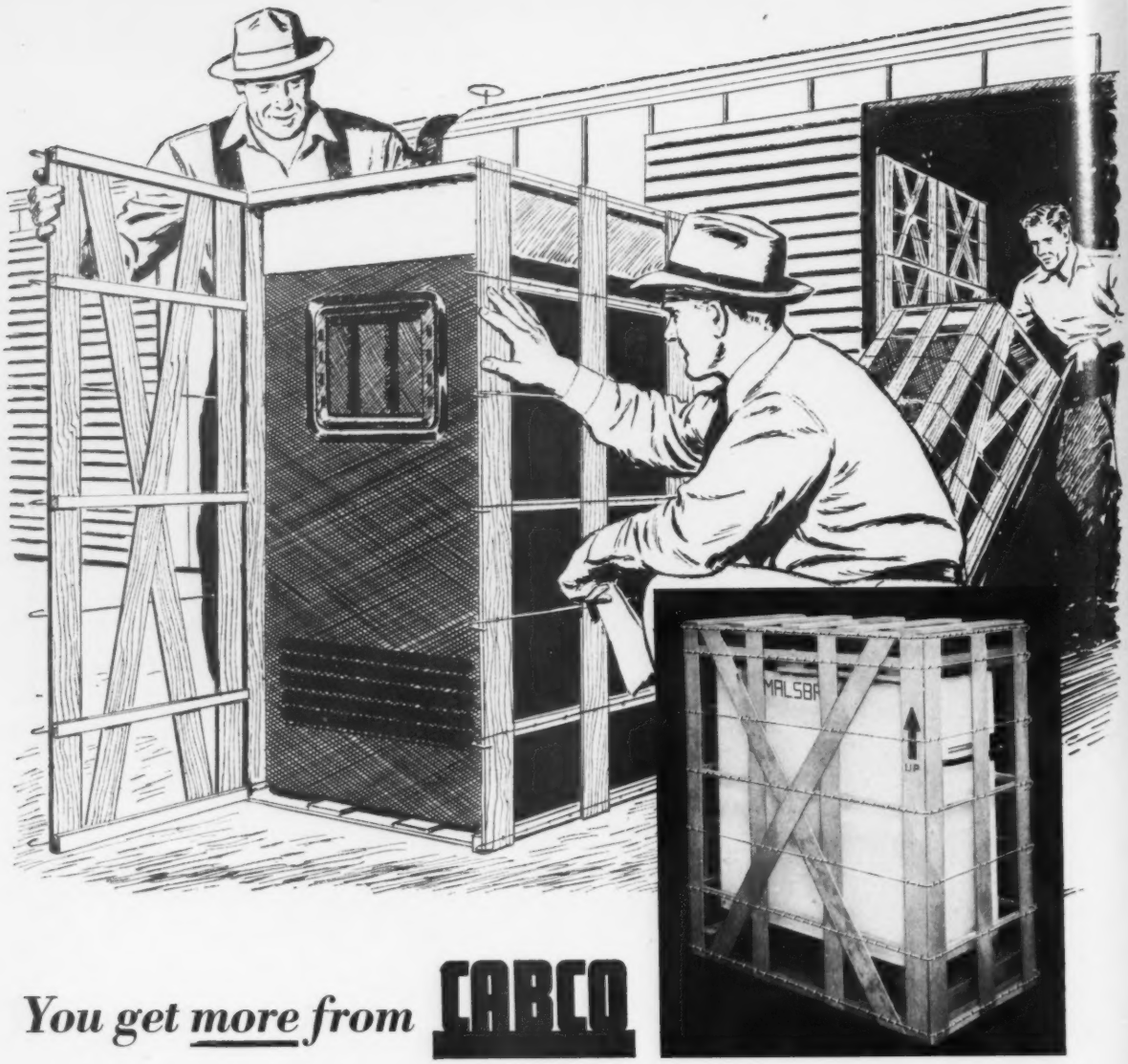
Western Industry

October 1953

These appear to be vertical venetian blinds, but actually are turning vanes in an aircraft wind tunnel. See page 26

COST REDUCTION—



You get more from CABCO

Performance... in a shipping container, performance means product protection—result of sound container engineering and careful manufacture. In Cabco containers, the great strength and lightness of Douglas Fir is combined with the natural shock absorbing action of the wirebound design. Each cleat, slat—even spacing of the stout steel wires—is precisely engineered for perfect fit, maximum protection. The outstanding performance of these Cabco wirebounds is another reason why Cabco is the West's foremost manufacturer of wooden shipping containers—and has been since 1883.

MALSBARY MANUFACTURING COMPANY'S Model 110 Steam Cleaner ships as a National Safe Transit Approved unit in custom-designed Cabco wirebound. Wirebound not only delivers the 540 lb. machine undamaged, ready to use; but light, tough container saves 40 lbs. on tare weight, cuts crating time from 45 to 8 minutes. Crate is used for export as well as domestic shipment.

Sold only by

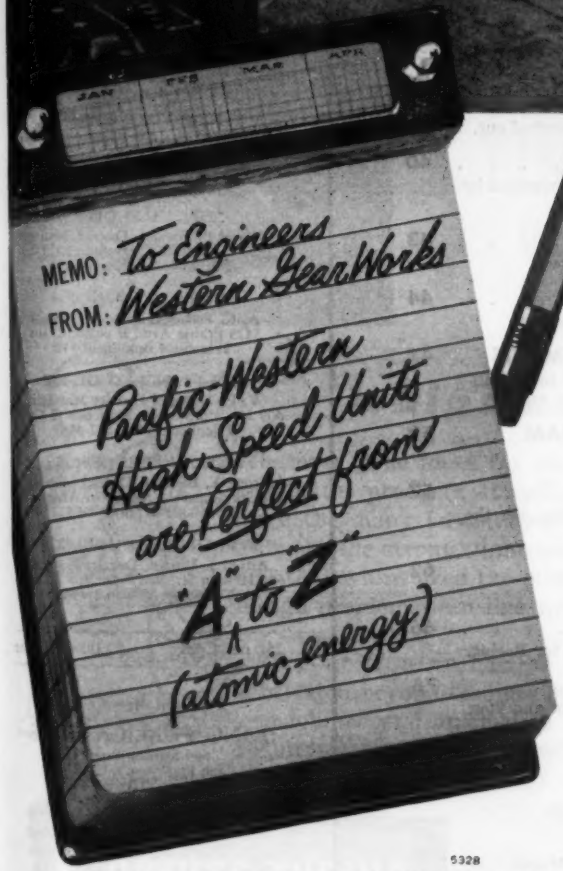
DUFF CALIFORNIA CO.

100 Bush Street, San Francisco 4 • 2581 E. Eighth Street, Los Angeles 23
501 Dooly Building, Salt Lake City 1

2762

Cabco containers are a product of the California Barrel Company, Ltd., the West's foremost designer and manufacturer of wooden shipping containers

Pacific-Western high speed units find application in many industries, including the one pictured above, taken at the Hanford plutonium manufacturing plant. The Hanford Works is operated by the General Electric Company for the Atomic Energy Commission.



Your problem may not involve Atomic Energy, but whatever it is, if it calls for a step up in speed between prime mover and driven equipment, you can be sure there is a Pacific-Western High Speed Unit "just right" for your needs. A full range of ratios and horsepowers in standard as well as special designs will meet your needs. Our engineers will be glad to assist you in your selection without charge or obligation. Western Gear Service is a *complete service.* Call us now for further information.

Bulletin 5204 H. S. is yours for the asking. Complete coupon below.

WESTERN GEAR WORKS
Executive Offices, Post Office Box 182, Lynwood, California.
Please Send Bulletin 5204 H. S.

NAME_____

COMPANY_____

TITLE_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

5328

Write, wire or phone your nearest Pacific-Western office

Plants — 417 Ninth Ave. S., Seattle 4, Washington
2000 E. Imperial Highway, Lynwood (Los Angeles County), California
1035 Folsom St., San Francisco 3, California
Belmont (San Francisco Peninsula), California
132-134 W. Colorado St., Pasadena 1, California
117 N. Palmer St., Houston 3, Texas

Representatives — N. 2605 Division St., Spokane, Washington
930 S. E. Oak St., Portland 14, Oregon
Room 212, Ross Bldg., Denver 2, Colorado
500 South Ervay Street, Dallas, Texas
Engineering & Machinery Ltd., 1366 W. Broadway, Vancouver, B. C.

WESTERN GEAR WORKS
Manufacturers of PACIFIC-WESTERN Gear Products
Pacific Gear & Tool Works

Plants: Seattle
San Francisco
Belmont (S. F. Peninsula)
Lynwood (Los Angeles County)
Pasadena
Houston

Western Industry

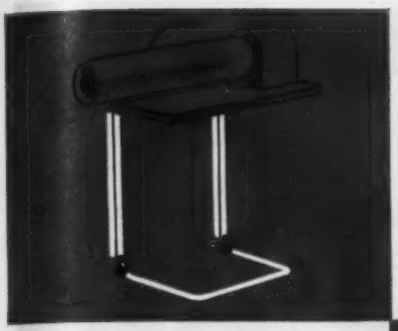
CONTENTS

OCTOBER • 1953

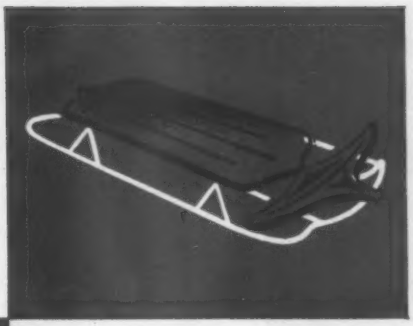
Volume XVIII, Number 10

ARTICLES

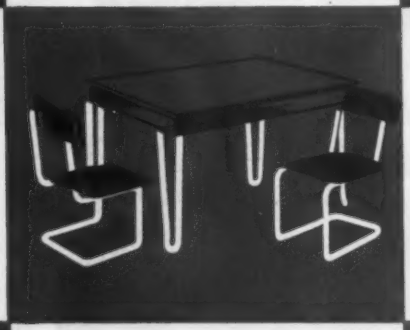
DEPARTMENTS



OSTUCO TUBING is versatile!

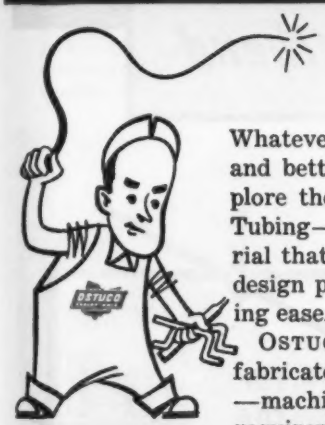


OSTUCO TUBING is versatile!



OSTUCO TUBING is versatile!

OSTUCO TUBING is versatile!



whips new ideas into shape

Whatever your ideas for creating new and better products, it will pay to explore the many advantages of OSTUCO Tubing—the strong, light-weight material that whips even the most stubborn design problems into line with surprising ease.

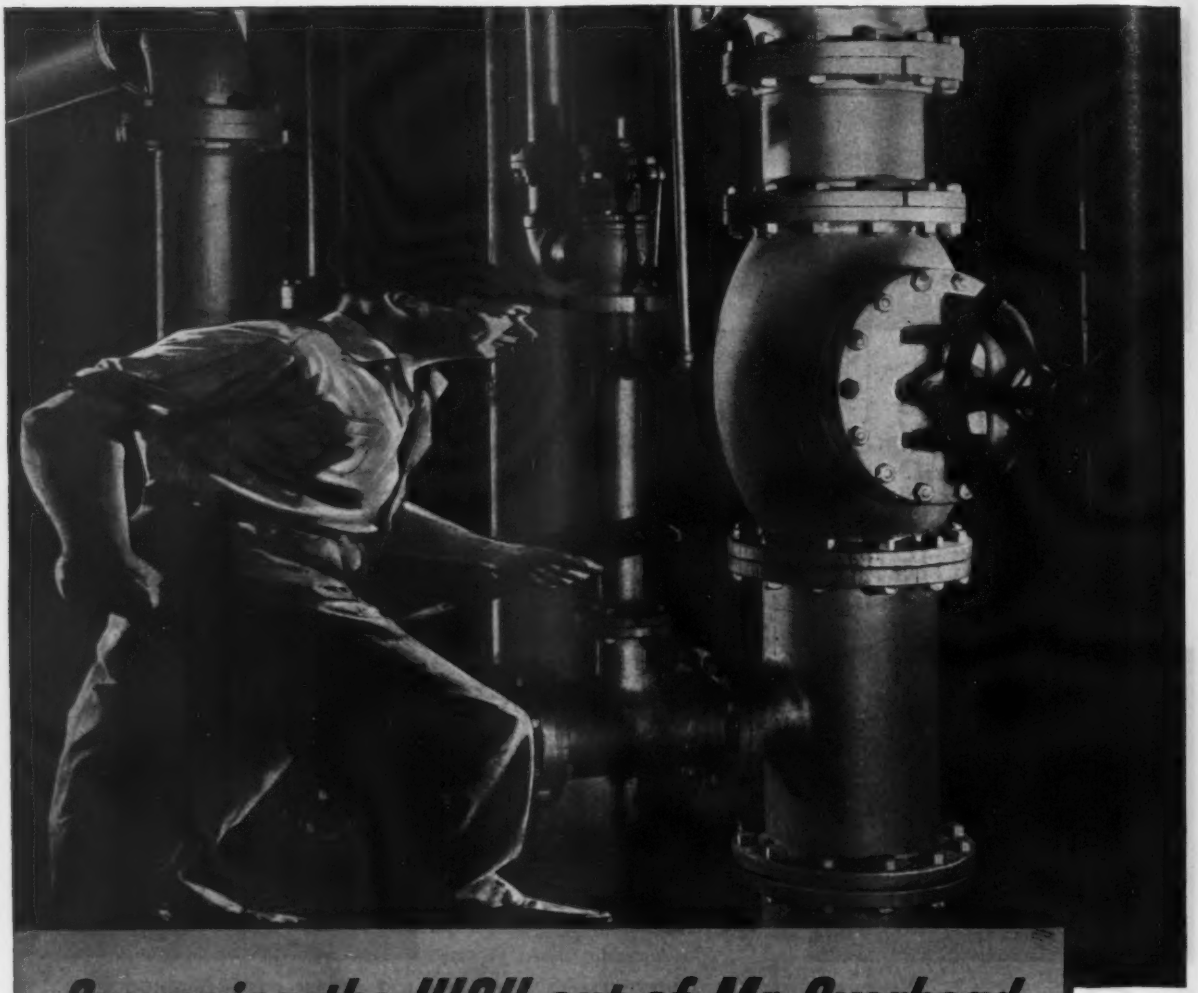
OSTUCO TUBING can be forged or fabricated beyond recognition as a tube—machined and finished to your exact requirements—quickly joined in assemblies by a large variety of mechanical or welding methods.

Modernized and greatly expanded facilities for *manufacturing, shaping,* and *fabricating* tubing, all at one plant—plus our own steel source as a member of the Copperweld family—enable OSTUCO to speed deliveries, assure uniform high quality, and cut your final costs. Write for informative booklet "Fabricating and Forging Steel Tubing."

OHIO SEAMLESS TUBE DIVISION
of Copperweld Steel Company
Manufacturers and Fabricators of Seamless and Electric Welded Steel Tubing
Plant and General Offices: SHELBY, OHIO

OSTUCO SHELBY, OHIO

SALES OFFICES: Birmingham, P. O. Box 2021 • Chicago, Civic Opera Bldg., 20 N. Wacker Dr. Cleveland, 1328 Citizens Bldg. • Dayton, 511 Salem Ave. • Detroit, 520 W. Eight Mile Road, Ferndale • Houston, P. O. Box 17007 • Los Angeles, Suite 300-170 So. Beverly Drive, Beverly Hills • Moline, 617 15th St. • New York, 70 East 45th St. • Philadelphia, 2004 Packard Bldg., 15th & Chestnut • Pittsburgh, 1206 Pinewood Drive • St. Louis, 1230 North Main St. • Seattle, 3104 Smith Tower • Syracuse, 2350 Bellevue Ave. • Tulsa, 245 Kennedy Bldg. • Wichita, 622 E. Third St. • *Canadian Representative:* Railway & Power Corp., Ltd.



Squeezing the HIGH out of Mr. Overhead

Right now, a lot of plants are giving Mr. Overhead a thorough going over. And while in many areas nothing can be done about high costs, in others a little figuring may show big chances for economy.

Take piping maintenance for instance. At today's labor rates, the cost of servicing inferior and obsolete piping equipment is higher than ever. But it can be reduced—quickly—with better quality equipment that also strengthens your guard against production losses.

Thrifty buyers know this—that's why they insist on Crane Quality equipment. They know it assures longer life, greater dependability, lower ultimate cost . . . and that Crane provides the best selection for the piping needs of every industry.

Crane Co., *General Offices:* 836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas.

CRANE

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

Gladding, McBean & Co.

REFRACTORIES Reporter

NEWS-VIEWS OF INTERESTING WESTERN INDUSTRIAL DEVELOPMENTS

CONSTRUCTION MAINTENANCE TIPS

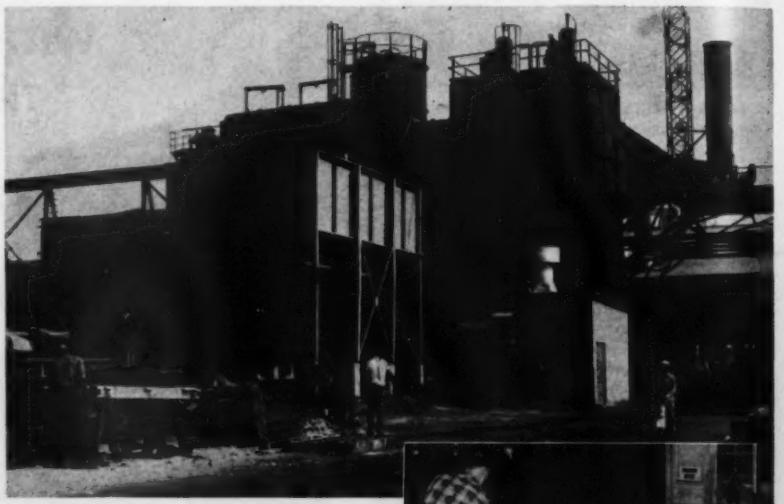
Many insulation problems involving industrial and domestic furnaces and heat generating equipment can be solved economically with Gladding, McBean No. 110 Insulating Plastic. Made of expanded mica, it is unusually light and has excellent insulating properties.

No. 110 Insulating Plastic forms a 12-inch floor in a batch-type annealing furnace.

Mixed with water, No. 110 forms a smooth working plastic material which can be hand-plastered or trowelled onto almost any surface. It adheres well to brick work, metal or even glass. No reinforcing is necessary when it is applied up to a thickness from 1 to 1½ inches. Thicker applications require the use of light wire mesh.

No. 110 was used here to form an insulating jacket around a heat duct.

No. 110 Insulating Plastic weighs from 17 to 19 pounds per cubic foot after application. It has a useful temperature range up to 2000°F. For complete information on this product call your local Gladding, McBean sales office or write for your copy of our free technical bulletin "Lightweight Refractory Insulation."



NEW FACILITIES INCREASE HERCO FOUNDRY CAPACITY

Herco Foundry Co., South Gate, California, producer of cast iron soil pipe and fittings, recently installed new equipment, making the plant one of the largest and most modern of its kind on the West Coast. Three new melting cupolas with precipitator type smoke control equipment and a heavy duty overhead crane system were installed. Gladding, McBean & Co. Acid Proof Brick and Cement were used to line the scrubbing chamber in the precipitator unit. Substantial quantities of firebrick were also used to line the cupolas.

G-McB PRODUCTS USED IN BIG UNIVERSITY INCINERATOR

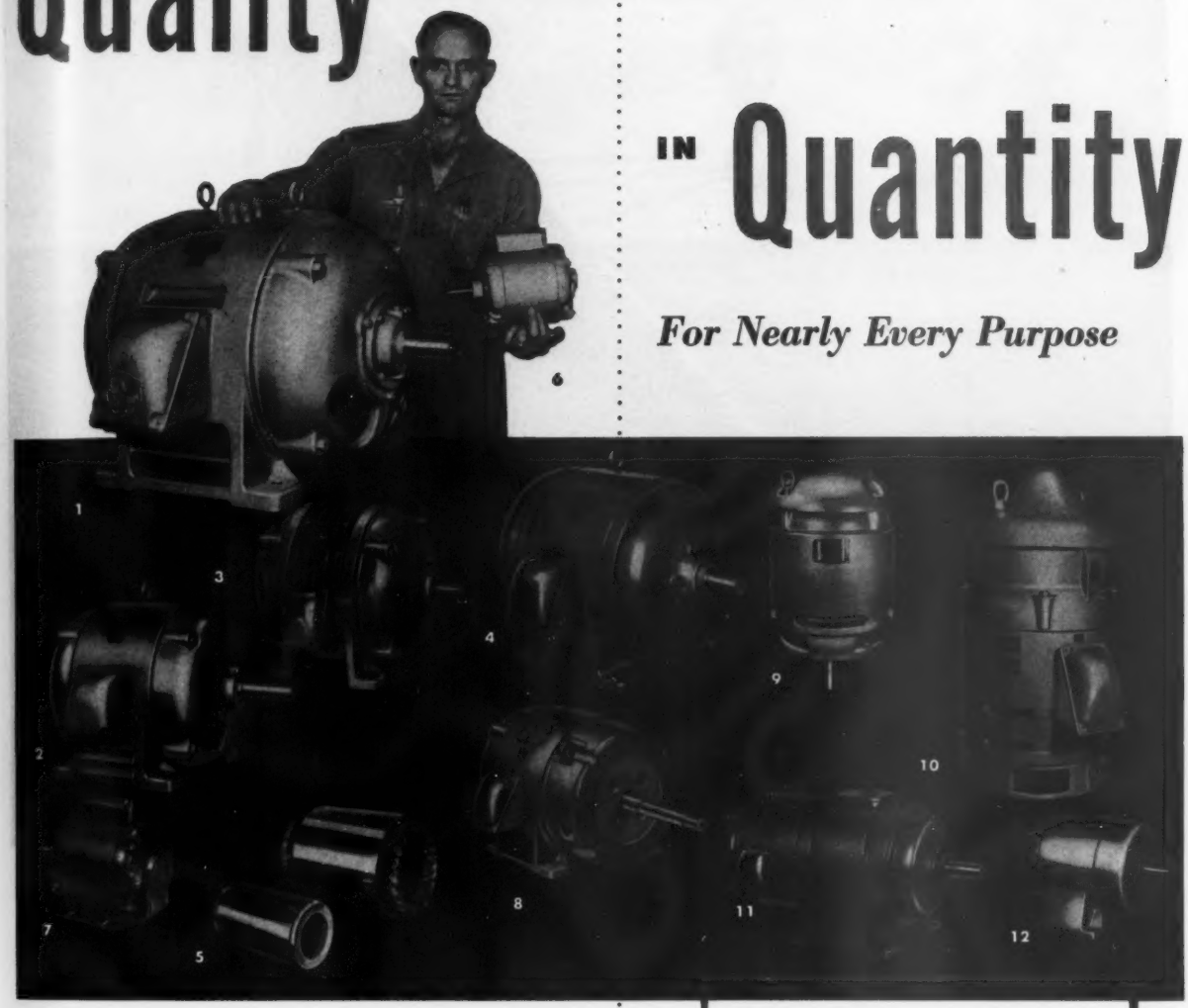
The massive incinerator above is being constructed at one of California's major universities. Gladding, McBean Diablo and Carnegie Firebrick and Tenax Cement are being used on this job. Left photo shows breeching as it enters circular stack.

GMB FIRST IN THE FURNACES OF WESTERN INDUSTRY

SALES OFFICES: LOS ANGELES · SAN FRANCISCO · PORTLAND · SEATTLE · TACOMA · SPOKANE

Quality MOTORS IN Quantity

For Nearly Every Purpose



Mechanical Types: Drip-proof (1); Splash-proof (2); Totally Enclosed Non-Ventilated (3); Totally Enclosed Fan-Cooled (4); Rotors and Stators (5); Rigid Base (6); Resilient Base (7); Flanged (8); Vertical Solid Shaft (9); Vertical Hollow Shaft (10); Gear Motor (11); Special Purpose (12).

Electrical Types: Fractional H.P. ¼ to ¾. Integral H.P. 1 through 500. Single phase. Polyphase. Normal Slip. High Slip. Normal Torque. High Torque.

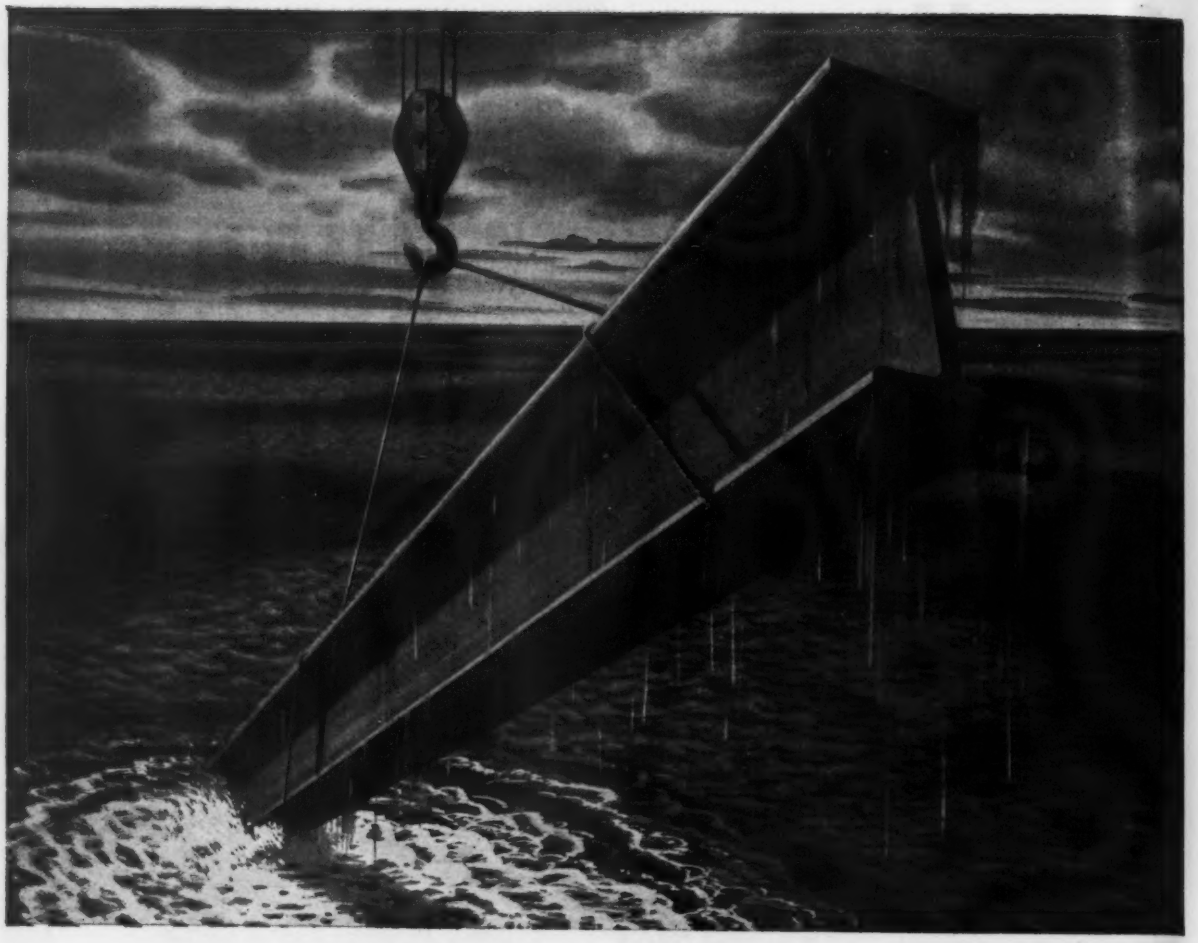
A. O. SMITH offers you quality motors in a wide range of types and sizes from ⅓ H.P. to 500 H.P. Proof of quality is demonstrated daily by hundreds of thousands of units which furnish power for all kinds of useful work. Service throughout the nation is provided by hundreds of Authorized A. O. Smith Motor Service Stations. Write today for information on standard or special types. A. O. Smith Corporation, Electric Motor Division, 5715 SMITHway St., Los Angeles 22, Calif.

A.O.Smith

ELECTRIC MOTOR DIVISION

FACTORIES: 5715 SMITHWAY ST., LOS ANGELES 22, CALIF. • 1000 WEBSTER ST., DAYTON 4, OHIO

Offices in Principal Cities. International Division, Milwaukee 1



Sea water...secret of more steel!

THE secret of improved open hearth furnace bottom performance—and increased ingot production for you—is high purity periclase derived from sea water magnesia.

Higher in MgO, lower in impurities, this sea water *periclase* is the heart of Permanente 165 ramming mix.

Proved superior by many of the industry's most progressive companies, Permanente 165 *retains highest strength at operating temperatures*—gives maximum refractoriness and maximum resistance to chemical attack.

Pre-shrunk for high density, the sea water periclase of patented Permanente 165 is bonded to *full depth* by crystal bridging—a solid phase reaction. *Result:* protection from costly breakthroughs, less down-time for repairs between heats, more tonnage per year!

YOUR western Kaiser refractory engineer will give prompt attention to your refractory problem—will offer, where desired, research, design and installation service to give you maximum production most economically. Write for descriptive literature on (1) Permanente 165, (2) the companion ramming mix, Permanente 84, and (3) Permanente Refractory Brick. Principal sales offices: *Chemical Division,* Kaiser Aluminum & Chemical Sales, Inc., 1924 Broadway, Oakland 12, California. First National Tower, Akron 8, Ohio.

Kaiser Chemicals

Basic Refractory Brick and Ramming Materials

Better brick...another secret of more steel!

THE PROVED SUPERIORITY of Permanente Basic Brick is the result of more than 10 years experience in producing basic brick specifically designed to give you better performance.

Many of the nation's largest steel producers rely on Permanente Basic Brick to give them longer life in service, less downtime for replacement and repair, and higher tonnages. Among its quality advantages are:

• *Pre-shrunk, accurately-sized periclase grains derived from sea-water magnesia* • Ceramic bond achieved through solid phase reaction; no appreciable liquids at operating temperatures • High refractoriness • Maximum density • Resistant to slag attack • High hot load strength • Maximum resistance to abrasion • Superior spall resistance • Great volume stability • Clean edges; accurate dimensions.

PERMANENTE REFRACTORY BRICK

PA (Permanente Periclase "A") brick burned for open hearth and electric furnace bottoms. Low in iron, chrome free, maximum MgO in bottom.

PCA, PCA-MC (Permanente Periclase-Chrome "A") brick, plain and metal-encased for open hearth end walls, front walls and uptakes. Metal-encased for electric furnace sidewalls. High in MgO. Outstanding all-purpose refractory.

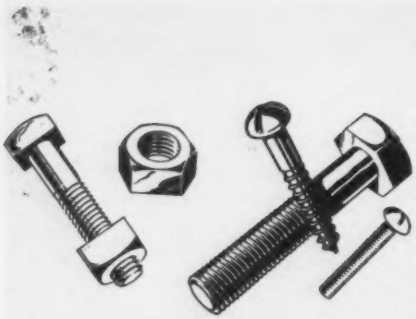
CPA (Permanente Chrome-Periclase "A") brick, burned for open hearth front and back walls. Controlled chrome additives result in highest resistance to spalling.

CPA-MC (Permanente Chrome-Periclase "A") brick, metal-encased for open hearth back walls, front walls. D (Permanente Chrome "D"), burned open hearth bottoms. High hot load strength.

Installation service at no extra cost.

Producers of the Most Complete Line of Basic Refractories

Dolomite • Magnesia • Magnesite • Alumina • Periclase



Essential to All These Products

You know how essential the right fasteners are to your product. They must be dependable, economical, properly designed and rigidly manufactured to measure up to your own product standards.

In many cases, you can meet every requirement by ordering standard fasteners from the most complete line made for industry, by National.

And, when you need a special fastener . . . there's no problem either when you call on National. For more than 60 years, our reputation has grown and our facilities have expanded . . . because we have been able to answer industry's need for an endless variety of specially engineered headed and threaded products.

We offer you experience and facilities second to none. We can tell you how your part can be produced economically and speedily . . . in the volume you need . . . and to the National standards of quality.

For the right fastener, essential to your product, send us your specifications or call your nearest National representative.

NATIONAL SCREW & MFG. CO. OF CAL.
3423 So. Garfield Ave., Los Angeles 22, Cal.
Div. of The National Screw & Mfg. Company, Cleveland 4, Ohio

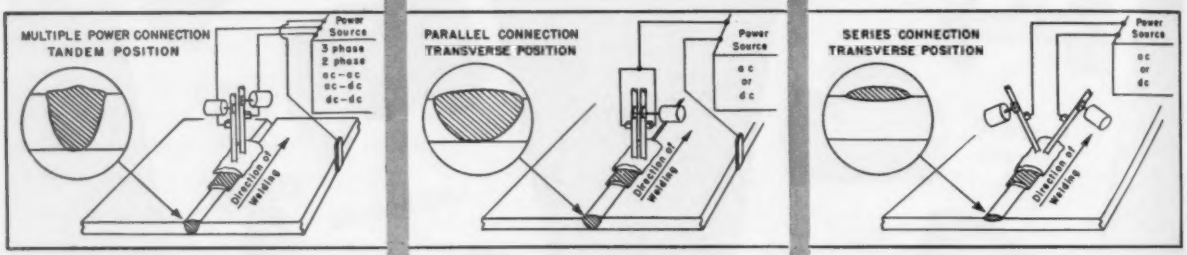
National PRODUCTS

FASTENERS HODELL CHAINS CHESTER HOISTS

CUT YOUR WELDING TIME IN HALF *with* UNIONMELT Multiple Electrode Welding

UNIONMELT Multiple Electrode welding with two or more electrodes in tandem, transverse, or other positions increases welding speeds up to three or four times faster than single electrode welding.

By using two or more electrodes in the same weld zone, magnetic reaction can be regulated to provide exceptional control over arc direction and weld shape.



Extra High-Speed Welds are made with multiple power connection and the electrodes in the tandem position. Speed is three to four times that of single electrode welding. This is particularly suited for welding long continuous seams, well-prepared and well-fitted, as in pipe, tanks, pressure vessels, and structural assemblies.

Extra Wide, High-Speed Welds are made with parallel power connection and the electrodes in the transverse position. Speed is twice as fast as for single electrode work. This is particularly useful for welding seams with gaps or other irregularities, as in center sills, ship plate, and heavy, hard-to-fit work.

Extra Shallow, Wide Welds are made with the series power connection and the electrodes in the transverse position. Speeds are many times faster than single electrode work and the dilution of the deposit is far lower than can be produced with a single electrode. This process will open new possibilities for surfacing and cladding all kinds of articles by automatic welding.

Complete UNIONMELT machines are available for multiple electrode welding and all UNIONMELT apparatus is designed for easy installation in any plant or factory. LINDE's engineers will be glad to determine how UNIONMELT Multiple Electrode Welding can best benefit you. Call your nearest LINDE office for more details on UNIONMELT Multiple Electrode Welding.

LINDE AIR PRODUCTS COMPANY
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
Offices in Other Principal Cities
In Canada: DOMINION OXYGEN COMPANY, LIMITED, Toronto

Linde TRADE-MARK

The terms "Linde" and "Unionmelt" are registered trade-marks of Union Carbide and Carbon Corporation.

If you want "Thru-the-Air" handling at its low-cost best, you can't beat this — a *genuine* P&H Zip-Lift Electric Hoist with rope control . . . only $199.50.

This new "Zip" is built to give you years of trouble-free service — *guaranteed* to withstand an occasional overload up to 25% more than the rated capacity. Other important advantages include real wire rope hoisting for wider side pull, double brakes for double safety, and easy installation (just hang it up and plug it in).

Yes, here's the number-one buy in the low-cost hoist field — the new Zip-Lift ready to save time and money for you. Check the many ways "Thru-the-Air" handling can cut your *costs*. Ask your nearby P&H Dealer to give your plant the once-over. His advice will cost you nothing — and he will save you money. Call him today!

Also available with full-magnetic push button control

Call your Zip-Lift Dealer or write for literature.

handle it "THRU THE AIR" with

P&H ZIP-LIFT

P&H PACIFIC DIVISION

HARNISCHFEGER CORPORATION

Plant, District Office and Warehouse
2400 East Imperial Highway, Los Angeles 59, Calif.

San Francisco, 100 Bush Street • Seattle, 2909 First Avenue, South • Denver, Room 415, Central Bank Building, 1108-15th Street

Western Industry

EDITORIALS

A lesson for today

A LESSON for all industry in the West may be drawn from the failure of Consolidated Engineering Corporation's "Instrument Park" project for Pasadena, featured in *Western Industry* several months back.

A tract was to be set aside exclusively for this company and other instrument manufacturers, with architecture, grounds and landscaping all conforming to high standards of civic beauty. Here was a type of industry with no smokestacks, piles of raw material, scrap or anything else to disfigure the landscape. Further, it called for a very high type of employee.

Yet the opposition of a few owners of large residences blocked the project. Consolidated put up a vigorous and intelligent battle, but the prejudice against industry is still too strong.

The lesson is that industry has a big public relations job ahead of it to enlighten the public as to industry's position in the community. It will take concerted effort over a long period by industry in general to put its individual members in a favorable position for such zoning problems. Nevertheless, the job can be started right now. What, for instance, has been done by industry to let the public know that the national nurserymen's association gives annual awards for the best industrial landscaping? Have the California Manufacturers Association, the Columbia Empire Industries, the Utah and Colorado manufacturers associations bestirred themselves on this?

"IE-ing" the AEC

THE FIRST ARTICLE in the main editorial section of this issue of *Western Industry* brings home the fact that rapidly growing young Western industries, which for the time being have gotten along without serious effort at cost reduction, must sooner or later turn to industrial engineering in order to effect necessary economies in manufacture. This means applying industrial engineering to estimating as well as to handling the work after it is received in the plant.

It seems to us that our biggest young industry in the West, the Atomic Energy Commission, could very well make use of industrial engineering, instead of blindly worshipping the idol of "results at any cost," which it now seems to be doing, judging by the tone of comment we hear from firms doing work for the AEC. To be sure, in such programs you haven't saved anything if you don't get the results, but at the same time there is no sense in spending two dollars when one dollar, intelligently utilized, will do the job just as well.

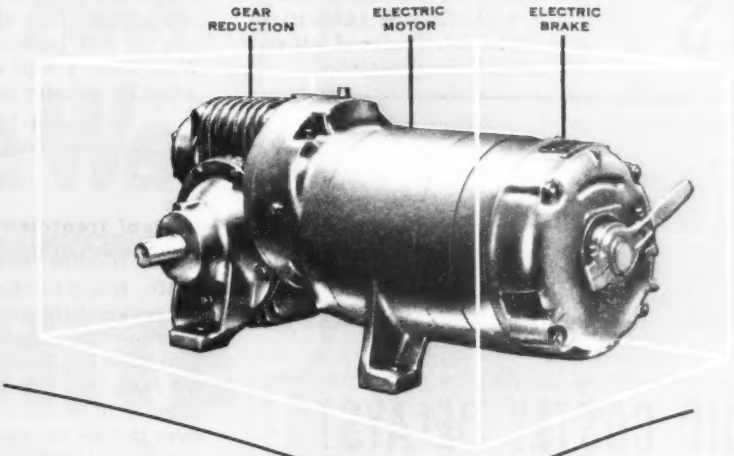
We feel that the cost of industrial engineering, applied on a comprehensive scale throughout AEC operations, would be only a minute percentage of the savings that could be effected without any loss of efficiency whatever. And it should be remembered that the AEC is spending "your money and mine" at a prodigious rate.

A bit of philosophy

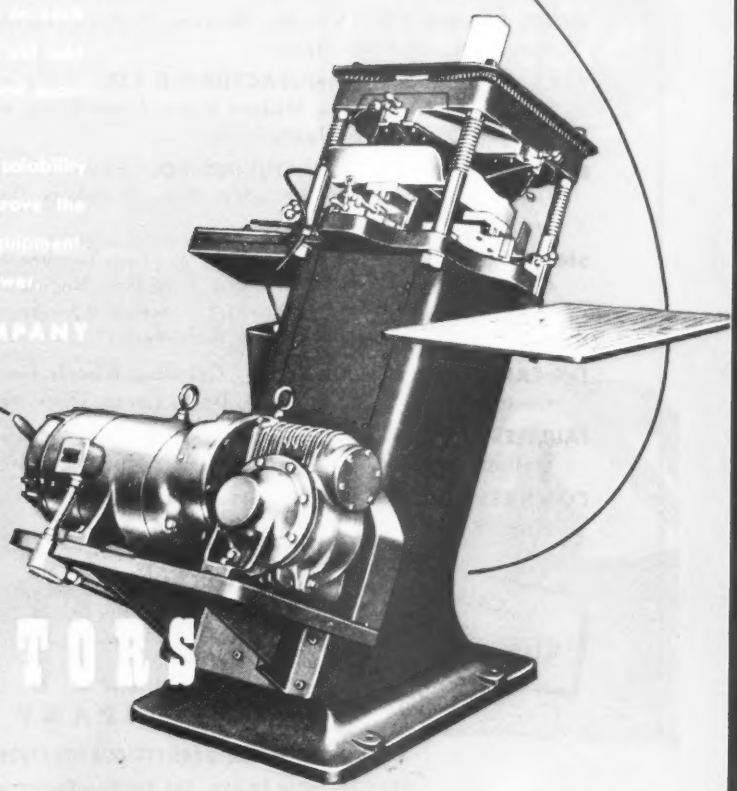
AT THE RECENT apprenticeship conference in San Diego, someone endeavored to introduce a business agent to a training supervisor, only to find that they had known each other for a long time.

"Oh yes, we've sat across the table from each other for years," said the training supervisor. "We're on excellent terms. In fact, when we get into discussions we find ourselves changing sides. The trouble seems to be that we are both too willing to let the truth come out!"

[EDITOR'S NOTE: This column on the editorial page, set off by itself, seems to be suited to general philosophizing, in contrast with the specific topics usually dealt with in the adjoining column. We offer the above conversation as the best bit of philosophy we have heard in some time.]



All in one package



MASTER

GEARMOTORS

THE MASTER ELECTRIC COMPANY
DAYTON 1, OHIO

WESTERN BRANCHES

SALT LAKE CITY PORTLAND SPOKANE SEATTLE LOS ANGELES SAN FRANCISCO

LETTERS

Contributions to this column from our readers are welcome. Names will be withheld from publication if so requested. Unsigned letters, however, will be disregarded.

Bulk loading gets attention

Editor, *Western Industry:*

We here at the Norfolk Port Authority found the article on bulk loading facilities [*Western Industry,* August 1953] to be highly interesting and informative and I send my compliments.

However, I did find one error which I do not believe is of any consequence, but which I believe I should call to your attention. On page 48, the picture of the coal dumping facilities are not those of the Norfolk & Western but belong to the Virginian Railway. But, as I said, I think that is a minor error and one which will attract little if any attention.

I think the article was splendid and you certainly have presented a strong case for bulk loading facilities on the West Coast. I hope it results in some action by industry in that direction.

ROY B. MCHENRY
Editor, *World Trade,* Norfolk, Virginia

* * *

Factual treatment

Editor, *Western Industry:*

Mr. Bruce Gordon, our president, has reviewed the article in which you mention the proposed bulk-loading facility for Los Angeles Harbor [*Western Industry,* August 1953] and considers it to be the best factual treatment that he has seen of bulk-loading operations throughout the country. I am glad to add my endorsement, also.

SAMUEL K. BELL
Bulk Loaders, Inc., Los Angeles

* * *

An ad for the Coast

Editor, *Western Industry:*

The information in the article "Bulk Loading Facilities Comparable to the East" is most interesting inasmuch as we loaded over the pictured Long Beach Terminal many thousands of tons of iron ore. We believe also that this is very good advertisement for the ports on the West Coast.

C. T. TAKAHASHI
C. T. Takahashi & Co., Seattle

[*The preceding letters refer to a careful study of the Pacific Coast bulk loading situation, pointing out the need for having adequate facilities that will permit the West Coast ports to compete for big bulk tonnage with the Atlantic, Gulf and Great Lakes ports. It is the first time this need has been brought to the attention of industry as a whole in the West.*]

* * *

Learning Curve never ends

Editor, *Western Industry:*

We are interested in obtaining tearsheets or a reprint of the article "The Learning Curve," which appeared in the September 1952 issue of *Western Industry.*

If you can supply us with a copy of this article will you please address to the attention of the Library, Solar Aircraft Company.

HAZEL KAYE RUSSELL
Librarian, Solar Aircraft Company
San Diego, Calif.

More letters on page 20

All Along the Way— WHITE is Right

Whether you need a heavy duty truck for hauling the big logs out of the woods—or a compact "3000" for delivering finished lumber, White has the answer.

White supplies the *right* truck to fit the job—one reason why White *earns more, costs less.* It will pay you to investigate. Your Local White Representative would like to give you the facts as they apply to your particular hauling problem. Plan to call him today.

THE WHITE MOTOR COMPANY
CLEVELAND 1, OHIO
Factory Branches, Distributors and Dealers Everywhere

The rugged log hauler (above) and the compact 3000 (below) typify the wide range of models designed by White for top efficiency on the varied trucking jobs required by modern industry.

FOR MORE THAN 50 YEARS THE GREATEST NAME IN TRUCKS

Photo courtesy Monarch Rubber Company

From far-off Akron

Editor, *Western Industry:*

Would it be possible for you to send me 2 copies each of your issues of September, October and November 1952—or tearsheets of the three articles by Glen Ghormley on "Learning Curves"?

RALPH GROSS
Ralph Gross Advertising, Inc., Akron, Ohio

* * *

Helps in estimating

Editor, *Western Industry:*

Please send us tearsheets or reprints of the article on "The Learning Curve" by Ghormley, which appeared in the September, October, December 1952 and February 1953 issues of *Western Industry.*

J. F. LIPSCOMB
Chief Estimator, Given Manufacturing Co., Los Angeles

[*Frankly, we never expected the demand for this series of articles on "The Learning Curve" to be so great, even though we knew at the outset that we were providing some badly-needed information.*]

* * *

Stream of inquiries

Editor, *Western Industry:*

The steady flow of inquiries resulting from Item No. 21 [Helpful Literature] which appeared in March of this year in *Western Industry* amazes me.

Saturday morning, September 12, for example, we received still another. I regard this as conclusive evidence of the effectiveness of *Western Industry* and again express appreciation for inclusion of the item mentioning Business Trends in Arizona.

Every good wish.

GEORGE V. CHRISTIE
Vice-President, First National Bank of Arizona, Phoenix

STANDARD ENGINEER'S REPORT

DATA

LUBRICANT Calol Cutting Oil 39-DA

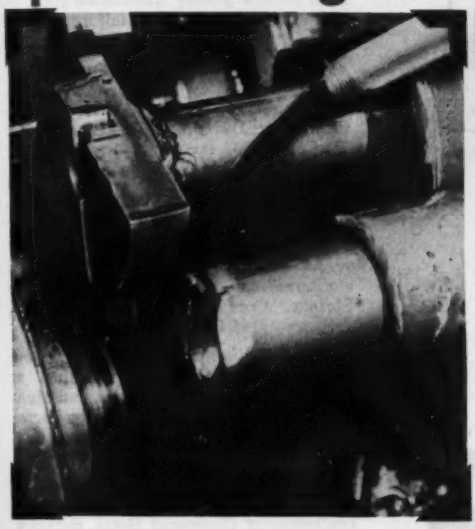
UNIT Automatic screw machines 1/2" to 5 1/4"

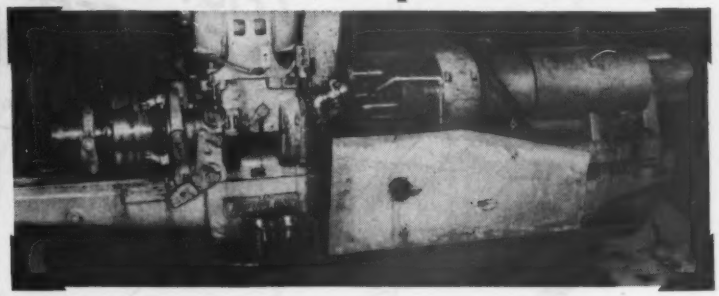
LUBRICATOR Circulating

SERVICE Machining spun cast stainless steel

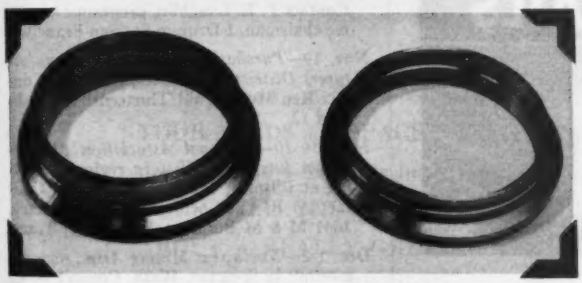
FIRM Speedway Engineering Co., Montebello, Calif.

Special cutting oil boosts tool life, improves finish!





WHEN CALOL CUTTING OIL 39-DA replaced a competitive oil on this 4½-inch Cleveland Automatic Screw Machine, it greatly increased tool life, improved the finish, and produced the close tolerances required in machining spun cast stainless steel. Tool life on this machine now averages 8 hours. The aircraft flange being worked at left, requires a 100 micro-inch finish and a final tolerance of 0.0015 inch. The Speedway Engineering Company has found Calol Cutting Oils completely uniform and able to handle efficiently any work in their shop.



THE HIGH FINISH OBTAINED with Calol Cutting Oil 39-DA is shown in this comparison photograph. The spun cast stainless steel flange (left) has been rough cut, while the other (right) has had final machining. This shop also uses Calol Cutting Oils on engine and turret lathes, milling machines, and drill presses.

FREE CATALOG: "How to Save Money on Equipment Operation," a handy booklet full of valuable information, is ready for you. Write or ask for your free copy today.

CALOL

TRADEMARK "CALOL" REG. U.S. PAT. OFF.

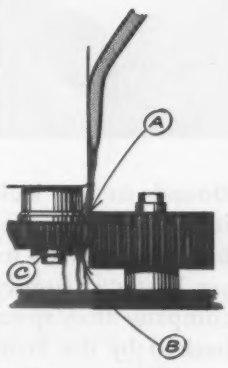
How to increase efficiency in all metal-cutting operations

Use the correct Calol Cutting Fluid for any operation from grinding to broaching. Recommendations for each are made from actual working results.

A. Have high cooling and lubricating qualities—minimize "built-up edge" and promote good finish.

B. Flush away cuttings readily.

C. Protect machine and work against rusting and corrosion.



STANDARD TECHNICAL SERVICE checked this product performance. For expert help on lubrication or fuel problems, call your Standard Fuel and Lubricant Engineer or Representative; or write Standard Oil Company of California, 225 Bush St., San Francisco.

STANDARD OIL COMPANY OF CALIFORNIA

CALENDAR OF MEETINGS

OCT. 22—*California Manufacturers Association.* Hotel Statler, Los Angeles. Contact: Los Angeles office of CMA, 304 W. 8th St.

OCT. 27-30—*California Section, American Water-Works Association,* state convention, San Francisco. Contact John C. Luthin, secy.-treas., 1113 Laurent St., Santa Cruz, Calif.

OCT. 28-31—*International Mining Days* and *New Mexico Mining Association* collaborate with AIME's regional fall meeting, El Paso, Texas. Contact Ben D. Roberts, 310 San Francisco St., El Paso.

Nov. 1-3—*Pacific Northwest Trade Assn.* Fall conference on water resource development, Hotel Davenport, Spokane. Contact D. C. Knapp, executive secretary, 1217 Joseph Vance Bldg., Seattle.

Nov. 6—*American Iron and Steel Institute,* Hotel Mark Hopkins, San Francisco. Contact D. R. James, 350 5th Ave., New York.

Nov. 6-8—*Furniture Mfrs. Assn. of Southern California.* At El Mirador Hotel, Palm Springs.. Contact Edward S. Feldman, exec. sec., 2155 E. 7th St., Los Angeles.

Nov. 9-10—*California Fertilizer Association,* annual convention, business sessions at Golden Bough Theatre, Carmel, and Monterey Peninsula Country Club. Headquarters hotel for session, Hotel LaPlaya, Carmel, Calif. Contact secy.

Nov. 11-13—*Association of Food Industry Sanitarians* annual business meeting and conference at Claremont Hotel, Berkeley. Contact P. E. Laughlin, program committee chairman, 1 Drumm St., San Francisco.

Nov. 19—*Purchasing Agents and Manufacturers District Conference,* Oakland. Contact Ken Moeller, 427 Thirteenth St., Oakland 12.

Nov. 19-20—*National Association of Corrosion Engineers,* Western regional meeting at Biltmore Hotel, Los Angeles. Contact A. B. Campbell, executive secretary, 1061 M & M Building, Houston 2, Texas.

DEC. 1-2—*Northwest Mining Assn.*, regional meeting in Spokane, Wash. Contact E. C. Stephens, Peyton Bldg., Spokane 4.

DEC. 31-JAN. 3, 1954—*California & Nevada Manufacturers of Carbonated Beverages,* regional meeting, San Francisco. Contact George Culley, exec. secy., 20 S. First St., Alhambra, Calif.

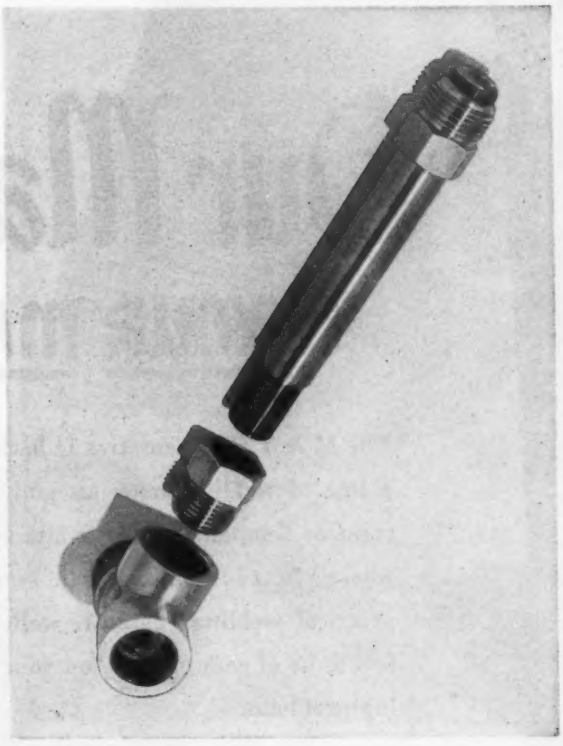
1954

JAN. 7-8—*Canners League of California,* annual fruit and vegetable sample cutting, Hotel Fairmont, San Francisco. Contact Canners League, 64 Pine St., San Francisco 11.

FEB. 2-5—*American Society of Sugar Beet Technologists,* eighth general meeting, Shirley Savoy Hotel, Denver. Contact Box 531, Fort Collins, Colo.

FEB. 15-17—*National Welding Supply Association,* national convention, San Francisco. Contact Robert C. Fernley, secretary-treasurer, 1900 Arch St., Philadelphia 3, Pa.

A NEW INVENTION



THE greatest development in cylinder manifold design and construction in over four decades.

Now you can assemble a cylinder manifold right on the job, without special tools; it can be shipped in ordinary boxes and put together with the ease expected of a modern "erector set." All parts fit snugly, leakproof and assure accurate over-all dimensions.

And—when desirable, the manifold may be expanded to meet increased gas capacity or you can take it apart for removal or storage; the newly invented "differential thread" joint makes all of these long hoped for qualities a reality.

NOW—you are the doctor; you may design and assemble cylinder manifolds to meet YOUR NEEDS and SPACE REQUIREMENTS RIGHT ON THE JOB—and your cylinder manifold will never become obsolescent or inadequate. YOU CAN EXTEND IT AT YOUR WILL. GET THE FACTS . . . WRITE TODAY . . . GET THIS EXCITING NEWS ABOUT A REALLY GREAT IMPROVEMENT IN CYLINDER MANIFOLD DESIGN AND ASSEMBLY METHOD.

DEALERS AND DISTRIBUTORS NOTE: now you can carry IN STOCK all of the parts needed for any size or type of cylinder manifold . . . no loss of orders because you must await a factory shipment. Why not write today for full information—it's worth your time.

Made by National SINCE 1910 WELDING EQUIPMENT CO., San Francisco 5, California

831

Our Man
IS YOUR MAN

The M & T representative is backed by a line of welding materials and equipment as complete as any available anywhere. In addition, he is a seasoned, practical welding engineer, well qualified to be of genuine help on your welding problems.

If the latest in welding techniques, equipment and materials can assist you, *our man is your man*—for orders or advice.

DETINNING • THERMIT WELDING • METALS and ALLOYS • ARC WELDING—Materials and Equipment CHEMICALS and ANODES for Electrotinning CERAMIC OPACIFIERS • STABILIZERS for Plastics TIN, ANTIMONY and ZIRCONIUM CHEMICALS

VISIT US
At the METAL SHOW—Space 1908.

METAL & THERMIT CORPORATION

100 EAST 42ND STREET • NEW YORK 17, N. Y.

Murex® Electrodes . Arc Welders . Accessories

You can obtain custom-cut felt parts from American, ready for assembly without further processing. Gaskets, washers, seals, wicks, discs—any shape you need, simple or complicated, can be turned out by us on high-speed machines, with tolerances to meet your specifications.

QUICK DELIVERY —American operates four strategically-located cutting shops to serve industry. The one nearest you will fill your order rapidly. Cutting shops are located at:

GLENVILLE, CONN. DETROIT, MICH.
LOS ANGELES and SAN FRANCISCO, CALIF.

These are manned and managed by men who will see that your production is never slowed up by lack of cut felt parts.

QUALITY —American produces felt to exact specifications, uniform in density, blend, thickness, strength. This is an engineering material which can be controlled as closely as any other. If you wish, we will cooperate with you in designing felt parts and specifying the right felt to meet your exact requirements, whether for commercial or government applications.

QUOTATIONS—Send blue prints and specifications to the nearest Sales Office. Bids will be made at once.

AMERICAN CUT FELT PARTS MAKE IT UNNECESSARY FOR YOU TO INVEST IN MACHINERY AND TRAIN MEN TO CUT FELT TO YOUR SPECIFICATIONS.

American Felt Company

TRADE MARK

GENERAL OFFICES: GLENVILLE ROAD, GLENVILLE, CONN.

PACIFIC COAST: A. B. BOYD COMPANY, 514 SPRECKELS BLDG., SAN DIEGO, CALIF.

SALES OFFICES: New York, Boston, Chicago, Detroit, Cleveland, Rochester, Philadelphia, St. Louis, Atlanta, Dallas, San Francisco, Los Angeles, Portland, Seattle, San Diego, Montreal — PLANTS: Glenville, Conn.; Franklin, Mass.; Newburgh, N. Y.; Detroit, Mich.; Westerly, R. I. — ENGINEERING AND RESEARCH LABORATORIES: Glenville, Conn.

THIS MONTH'S COVER

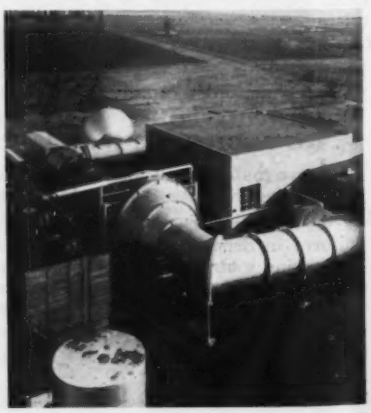
NACA WIND TUNNEL— crucible of future planes

SUPERIOR performance of America's military and civil airplanes of the future is firmly founded in research. Ames Aeronautical Laboratory, operated by the National Advisory Committee for Aeronautics at Moffett Field, near Sunnyvale, Calif., is the major West Coast center for research in high-speed aerodynamics.

Fourteen major wind tunnels at Ames Laboratory are in constant use as scientific tools for predicting and improving the performance of airplanes of tomorrow. The usual type of wind tunnel is a closed rectangular tube through which air can be driven at continuous and varying speeds. Turning vanes, much like vertical venetian blinds, swing the air stream smoothly around the corners of the tunnel.

The vanes in the cover picture are in the Ames 12-foot pressure tunnel whose air-tight shell is constructed from over 3,000 tons of arc-welded steel plate. Electric motors totaling 13,000 hp. turn two 18-ton coaxial fans to drive the 135 tons of air contained within the tunnel. Top speeds up to 750 mph. can be attained. The heavy tunnel shell permits operating the test equipment at six times atmospheric pressures or at a vacuum of one-sixth of an atmosphere.

AN AIR STREAM twice the speed of sound or about 1,500 mph. can be generated by this Ames 6- x 6-ft. supersonic wind tunnel.



You're looking at steel sheets being made to order!

Even as it pours from the open hearth into a ladle, this steel already has a personality of its own. For this is not just steel, but steel designed for a *specific purpose*... in this case, sheets for steel furniture. Another batch might be for cabinets, home appliances, or any one of a thousand other applications. From the very beginning, steel from Columbia-Geneva is tailor-made to do the best job for you.

Knowing the end use for your steel, and working within the appropriate standards for your particular application, Columbia-Geneva metallurgists and other trained technical personnel are able to rigidly control the steel from start to finish. The results of this extra attention show up in the high quality of your finished products, and in the lack of rejects on your production line.

We like to think that this extra attention is also reflected by the fact that Columbia-Geneva stands today as the West's largest steel producer.

U·S·S Steel Sheets

COLUMBIA-GENEVA STEEL

Division United States Steel Corporation, San Francisco

UNITED STATES STEEL

Safety Plate... Quick Delivery

The Famous Inland 4-Way Design

The next time you're looking for an answer to an under-foot problem where sure traction, easy maintenance and long wear are important, call Ryerson for Inland 4-Way Safety Plate.

The lugs in this attractive Inland pattern are hot rolled at right angles to each other to provide safe footing in all directions. There are no pockets where liquid or dirt can collect, so the surface is easy to drain and sweep.

This firesafe, long-lasting plate is available in two pattern sizes and a wide range of thicknesses. You can order it sheared, bent or punched to your specifications. Our stocks are complete—and we can assure you of immediate shipment.

PRINCIPAL PRODUCTS: CARBON, ALLOY & STAINLESS STEELS—BARS, STRUCTURALS, PLATES, SHEETS, TUBING, MACHINERY & TOOLS, ETC.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC.

LOS ANGELES—Plant: 4310 E. Bandini Blvd. Mail: Box 3817, Los Angeles 54. Phones: Angelus 2-6141, from San Diego (no toll), Zenith 6660.
SAN FRANCISCO—Plant: 65th & Hollis Sts., Emeryville. Mail: Box 188, Emeryville, California. Phones: Olympic 3-2933, Enterprise 1-0176.
SEATTLE—Plant: 1200 - 4th Ave. Mail: Box 3268, Seattle 14. Phone: Seneca 2300.
SPOKANE—Plant: North 207 Freya St. Mail: Box 2158, Spokane 10. Phone: Keystone 9311.

Western Industry

OCTOBER 1953

IT PAID OFF FOR LENKURT

Manufacturing cost reduction became possible, and kinks straightened out, when this growing young Western company instituted industrial engineering

MANY Western companies are going through experiences similar to that of Lenkurt Electric Company of San Carlos, California, which has grown from 18 employees to approximately 900 in five years, and as a result had given little attention to manufacturing methods or cost reduction.

Lenkurt found its answer a year and a half ago through giving greater recognition to industrial engineering, which up to that time had been carried on by two engineers operating as a segment of the production control department.

The existing problem and its solution were described by A. M. Elliott, chief industrial engineer, at the American Society of Mechanical Engineers meeting at Los Angeles last June.

Hodge-podge

On the assembly lines, work positions were a hodge-podge. Console bins had been purchased and set out on a basis of over-all requirements. Stock left over from previous assemblies and personal belongings of the operators littered the scene.

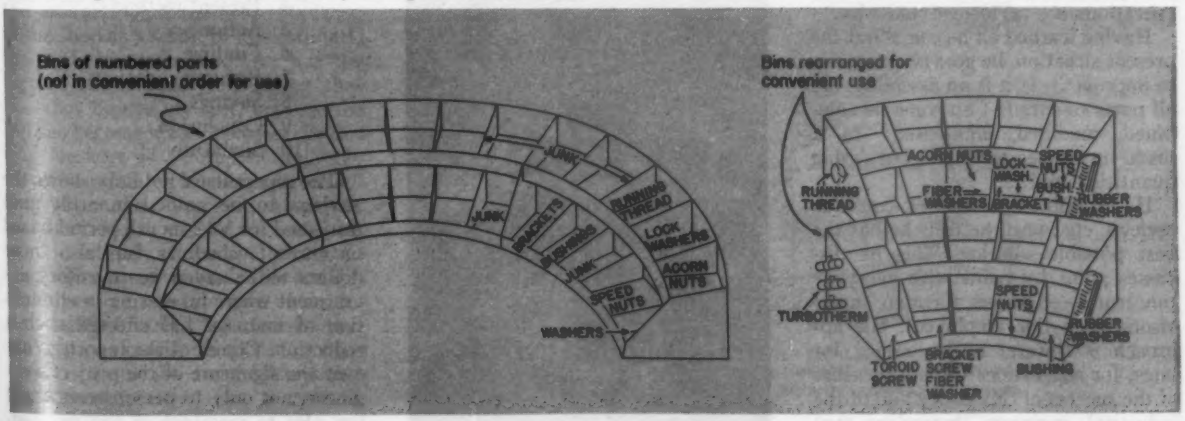
Since no operation sheets or layouts existed, setting up and performing a new job was left pretty much to the individual operator's experience, the supervisor's memory of how the job or a similar one had been run before, or both. Piece parts, components, connecting wires and their method of assembly showed little or no improvement from the original design worked out by the electrical engineer whose logical concern had been only one of making the circuitry operate correctly.

The same situation prevailed throughout the other manufacturing departments, toroidal coil and transformer winding, sheet metal, etc.

To remedy this situation, it was decided that all projects would be set up by number and formally assigned to an engineer. A project was set up from a project requisition which requested an investigation by the industrial engineering department and could be

BEFORE: There are too many bins, not arranged in logical order and incovenient to reach, in this parts console. When it was redesigned, one section was eliminated, bins were put in consecutive order, "junk" space was reduced.

AFTER: Operator uses a pair of consoles which are smaller and handier. When finished with one, consoles are switched.



LENHURT ELECTRIC CO. INC. SAN CARLOS, CALIF.

PROGRESS CHART

DATE 1-2-1953

SUBJECT CHARTED: PI-2401 FILTER
SUMMARY OF TIME STUDIES

DEPARTMENT: FILTERS CHARTED BY GRIDER PROJECT NO. 3 SHEET 1 OF 1

NOTES

OPERATOR - SAME IN EACH CASE
RATE ON PRESENT METHOD - 130%
RATE ON PROPOSED METHOD - 115%
DIFFERENCE IN RATE WAS DUE TO THE OPERATOR BECOMING ACCUSTOMED TO TIME STUDIES.

SUMMARY ELEMENTS		PRESENT	PROPOSED	DIFFERENCE
OPERATIONS	A			
TRANSPORTATIONS	B			
STORAGE	C			
INSPECTIONS	D			
DIST. TRAVELLED	E			
TIME	F			

PRESENT METHOD

ITEM	DESCRIPTION	A	B	C	D	E	F
1	PUT IN TERMINAL LEADS						1.25
2	SOLDER TERMINALS						.16
3	PUT SCREWS THROUGH BOARD						2.41
4	PUT SPEED NUTS ON SCREWS						1.40
5	ASSEMBLE L7 AND L8						3.84
6	" C1						1.17
7	" C6						.92
8	" C6						1.17
9	ATTACH LEADS OF L7 AND L8						1.17
10	ASSEMBLE C_{AN} CONDENSER						1.81
11	" C_8						1.32

PROPOSED METHOD

ITEM	DESCRIPTION	A	B	C	D	E	F
1	PUT IN TERMINAL LEADS						.95
2	SOLDER TERMINALS						.13
3	PUT SCREWS THROUGH BOARD						1.15
4	PUT SPEED NUTS ON SCREWS						1.46
5	ASSEMBLE L7 AND L8						.58
6	ATTACH LEADS OF L7 AND L8						.80
7	PLACE IN JIG						.05
8	ASSEMBLE C_{AN} CONDENSER						.72
9	" C_1 "						.66
10	" C_8 "						.82

Detailed operation sheets are written up from the right hand side of this progress chart and go to the various departments involved.

sent in by anyone through a department head.

Such requests or projects were given to the industrial engineer working in the area, most familiar with the type of activity, or simply to one who happened to be available.

This policy still prevails. Once this project is given to an industrial engineer, it is his entirely. Although he is free to consult with others, he must make his own decisions and work out his own problems as far as possible without throwing a burden on his supervisors. In this as in other phases of the industrial engineering operating policy, every opportunity for development and recognition of the industrial engineer as an individual is accented.

Starting out on a project the engineer first learns and records all he can about the present method. For example, amount made, costs, what operations are performed and why.

Having learned all he can about the present situation, he goes about trying to improve it. If it is an assembly, are all parts essential? Can some be combined, modified, eliminated? Is it made on proper tooling—considering quantities used?

He experiments, modifies, consults, reviews, etc., until he feels he has the best possible solution. This he discusses point by point with everyone concerned—engineers, foremen, supervisors, even line employees. His approach is sincere, he is looking for bugs, for suggestions. It is a measure of the success of this policy and of the industrial engineers themselves that the cooperation they seek in these instances is readily and enthusiastically forthcoming.

From these preliminaries often comes a new design requiring approval of the circuitry group. This is requested through an engineering change authorization, accompanied by a prototype made up by the industrial engineer himself or by a technician in the industrial engineering laboratory. While this is being processed, the industrial engineering laboratory or other facility will be fabricating the necessary jigs, machinery or equipment required.

Having achieved a new design, written up the new assembly procedure,

EACH completed electric wave filter is tested and tuned to assure exact compliance with design specifications.

and given a layout of the material consoles for the work positions, the industrial engineer will demonstrate the new method to the department foreman, supervisor and operator—if only one or two are involved. If more people are affected, he will show the proposal to a training supervisor, should the department require such assistance.

Then having satisfied everybody as to the manner of doing, he gives the foreman and production department the estimated standard output for the job. This is not for speed-up or incentive piece-rate purposes but is based on a fair day's work for a fair day's pay. It is the foreman's responsibility to maintain a standard. He may challenge it, in which case the industrial engineer must be prepared, and is, to defend and prove his figures.

While the foreman is responsible for maintaining a standard, he is also equally responsible for trying to improve it. Should he do so by altering the method, he requests a change of the operation sheet and/or material affected. Otherwise, unless improved, the industrial engineer's concepts must be rigidly adhered to. Here the responsibility falls on the two equally and is sustained throughout the life of the product.

Periodic watches

Once the job is rolling, the industrial engineer watches it periodically. At the end of thirty days he time-studies it and again at sixty days—or as often as may be necessary. This is to check his standard and also establish a learning curve. When he feels he has made all the major improvements he can and has satisfactorily answered the request of the person who initiated the project, he writes a report following a standard form under ten headings:

1. Project
2. Subject
3. Requested by
4. Present method
5. Action
6. Finding
7. Recommendations
8. Savings
9. Conclusion
10. Signature.

The report itself not only shows the savings to be gained monthly and projected for a 12-month period based on current schedules, but also those dollars to be saved on inventory investment where processing or elimination of material has effected such a reduction. Copies of the report go out over the signature of the project's engineer, not only to persons concerned but also to members of top manage-

ment, where they are received with considerable interest. Monthly summaries showing total savings to date are also issued by the department.

Such a report gains individual recognition for the engineer, giving him encouragement for further success. It aids his supervisors in their constant evaluation of his merits also necessary to his future and that of the department. Without them the position of the industrial engineering department might be open to challenge at various times, its true worth unknown and requests for assistance, equipment, personnel, etc., refused.

There are instances at Lenkurt where such reports are written up before the fact, on an estimated basis. This is the case where an industrial engineer's proposed method involves a heavy capital outlay. A complete redesign of work place and equipment involving a 45-machine department would naturally meet with very little enthusiasm if its proponent based his desires solely on intangibles. Here mock-ups, models, layouts, facts, are absolutely necessary to success.

In a growing company like Lenkurt, constantly bringing out new models and products, Mr. Elliott pointed out that the service rendered by industrial engineering cannot be measured or evaluated in dollar figures on a report because if the work has never been done before, there is no basis for comparison.

Problem of estimating

Estimating on new jobs to be done in a shop is always a problem, not only who should do such a job, but who should be responsible for seeing that the work is done within the estimate limits. Lenkurt feels that it has found a logical and successful solution. Both on new models of its carrier systems and on component items it makes for other manufacturers, the estimating of all labor content is done by the industrial engineer most familiar with the product. Once the order is placed in the shop as a result of this estimate, the same industrial engineer has the further responsibility of seeing that his labor figures are met, because the job has become his as a project. In this way Lenkurt is assured of not only realistic estimates in competitive bidding, but also clear-cut, efficiently manufactured models of its new products practically from the prototype stage. The company feels this activity alone justifies the existence of the industrial engineering department. Also, a comparable one should go a long way in paying the freight for such a department starting out in any industry.

Should convince doubters: an early project report

TEXT AND CHART both summarize a file, half an inch thick, on one project alone.

PROJECT: No. 3.

SUBJECT: F1-2901 Filter Mechanical Redesign and Operation Analysis.

REQUESTED BY: C. H. Scarce, Factory Manager.

PRESENT METHOD: The mechanical arrangement of L7 and L8 coils make assembly of condensers difficult. Also, since the heads of their mounting screws are on the stack side of the filter board, replacement of these coils, if repair is necessary, requires the removal of the other seven coils of this filter.

Arrangement of parts in the assembly bin is such that the operator's arms cross in reaching for parts. The three-section bin covers too wide an area for efficient operations. Miscellaneous material of no value to the operation is kept in those portions of the assembly bin not used for parts. As each coil is placed on the stack, its leads are connected. This requires the tools to be used each time and then laid down.

ACTION TAKEN: 1. In revising the mechanics of this filter, L7 and L8 coils were mounted on the stack side of the board and all condensers were placed on the other side of the board as illustrated on assembly print C-6823.

2. One section of the assembly bin was removed and the other two sections were arranged in a tandem manner so that only one section could be used at a time. Tubes were placed on the sides of each section for holding the necessary insulation, washers and brass studs.

3. Detailed operation sheets and bin layouts were issued to the assembly position, the supervisor and the foreman of the department. Both the operator and her supervisor were instructed in the proper method of assembly.

4. A jig was made for holding the filter board during assembly and soldering operations.

5. All coils are placed on the stack then the leads are connected.

FINDINGS: Time studies on the former method indicated that 8.4 filters could be built per day. Actual production figures showed an average of 8 per day. (This was based on a 430-min. work day—50 minutes being deducted for scheduled and non-scheduled rest periods and clean-up.) Time studies on the new method indicated that 13.4 filters could be built per day. This production rate has been achieved.

When replacement of either L7 or L8 is necessary, it can be done in about one-fourth time formerly taken for repair.

Placing of the bins in tandem and instructing the operator to assemble the required 13 partial filters from the "A" bin before shifting the "B" bin to the front for completing the assembly forced the operator to pace herself.

The holding jig eliminated much unnecessary handling of the unit during the assembly operation.

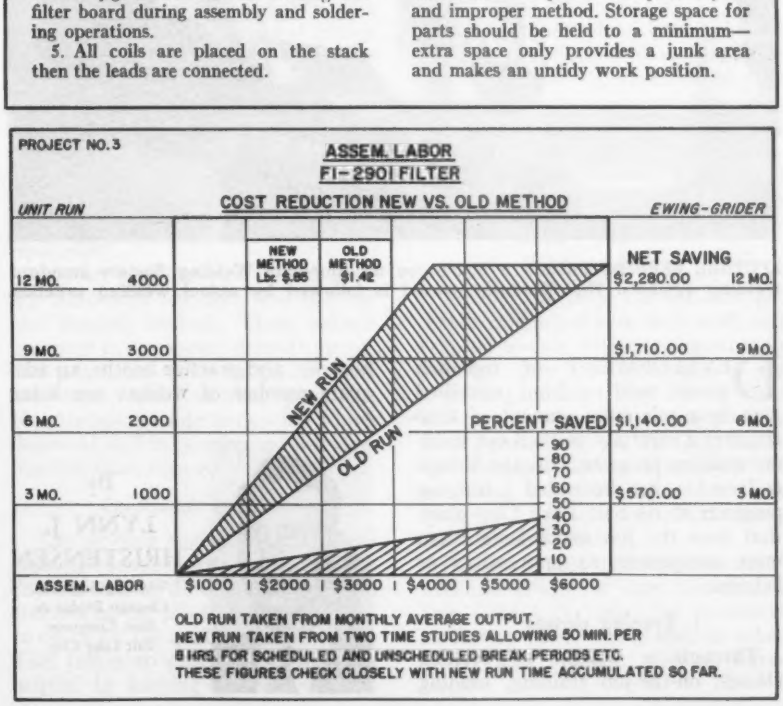
Two bin sections make a neater work position.

RECOMMENDATION: All assembly positions of this type filter should have the following:

a. Only two bin sections for each position.
b. Holding jig for each position.
c. Detailed instructions and bin layouts for each different filter.

SAVINGS:	*Before*	*After*
Assembly time per unit (min.)	51	31.97
Daily production	8	13.4
Unit labor cost per assembly	$1.42	$ .848
Unit saving		$ .572
Weekly savings (75/week)		$ 52.90
Annual savings		$2280.00

CONCLUSION: A great deal of time is lost because of poor work place layout and improper method. Storage space for parts should be held to a minimum—extra space only provides a junk area and makes an untidy work position.



ON THE JOB TRAINING + NIGHT CLASSES = QUALIFIED WORKERS

Here's how one firm solved its welder supply problems

LECTURE PERIODS include a discussion on American Welding Society standard welding symbols. The 30-minute period is followed by actual welding practice.

DEVELOPMENT of topnotch plate welders from unskilled men in a minimum amount of time requires a carefully worked out welders training program. Chicago Bridge & Iron Co. has instituted a training program at its Salt Lake City plant that does the job much faster than mere assignment as apprentices or helpers.

Evening classes

Through a system of evening classes, on-the-job training, welding libraries, and practice booths, an adequate number of welders are being turned out to handle all of the company's fabricating requirements at the Salt Lake plant.

By
LYNN J. CHRISTENSEN
Welding Engineer
Chicago Bridge & Iron Company
Salt Lake City

Nearly all structures fabricated are built in accordance with specifications set up by the company or its customers. These require welders to pass qualification tests for flat position groove welds and flat and horizontal fillet welds before they are allowed to weld on production work.

In view of this, the company is quite anxious that its training program bring welders to the point where they can pass these qualification tests just as soon as possible and thus be in a position to bring some return.

When a new man has passed the first qualification test, flat position, he is eligible for classification as a third class welder. A second class welder must pass qualification tests consisting of making welds on plates in the vertical and horizontal positions for all plate thicknesses. The first class welder must qualify in all positions for all thicknesses of plate to the satisfaction of an accredited inspection agency.

Welders course

One phase of the training program is a welding school or class designed to get the new men started right. The class meets for two hours immediately after work, two nights a week for a period of six weeks.

Prospective welders are not required to attend; however, most of them take advantage of the opportunity. The trainee receives no pay for time spent in welding school. The increased rate of pay which accompanies each change in classification is an incentive to at-

tend the class and learn welding as quickly as possible.

Preaching and practicing

Class period consists of a 30-minute lecture with the balance of the time being spent in actual welding practice. One of the company's welding engineers gives the talk covering the fundamentals of good welding practice. Information sheets are provided on welding machines, electrode classifications, weld symbols, arc air gouging, oxy-acetylene burning and gouging, safety precautions, and other pertinent subjects.

Students are given lesson sheets on a specific topic which is discussed during the lecture and practiced afterwards. These sheets point out the main things to watch for and the correct procedure for welding a particular type of joint or gouging as the case may be.

Samples are displayed during the lecture showing properly made welds and poorly made welds. Ten-minute technicolor movies are employed to better acquaint the students with the fundamentals of manual arc welding.

Supervised practice

During the practice period, two experienced men (usually one welding engineer and one of the Welding Department foremen) are on hand to supervise the students and make suggestions on how they can improve their technique or correct a poor procedure. Demonstrations by these men show the student welders how to make a good weld as well as the results of faulty welding habits. The class is limited to ten or twelve students, enabling the practice supervisors to give a considerable amount of attention to each individual.

During the latter part of the course, practice test plates may be made and tested to let the students know how they are progressing. Students get some experience during the regular work day by tacking for fitters.

WELDING SCHOOL LESSON: Lesson sheet shows procedure and gives suggestions on how to strike an arc.

WELDING SCHOOL

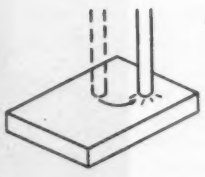
Lesson 1.

Object: To learn how to strike an arc.

Machine Setting - D.C. Reverse polarity
E6010 Rod 5/32"ø (1/8" arc length)
135A

Procedure:

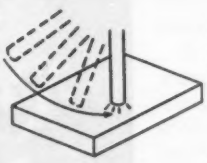
1. Difficulty is that rod sticks or fuses to work.
2. There are two methods used for striking an arc:
   a. Move rod down in vertical direction until it touches the plates, then withdraw it to the correct arc length.
   b. The second method is to move the electrode at an angle to the plate and sort of scratch the plate. When the arc has formed, withdraw the electrode to the proper arc.



TAPPING METHOD

3. If the electrode sticks, give the holder a quick twist. If this does not free the electrode, let go of the electrode with the holder. This must be done fast or the electrode will become red hot.
4. Never take helmet away from the face.
5. Practice starting with each of these methods. Hold the arc a few seconds then pull it away and try again, until you are able to start the arc as you desire.

   Hold a slightly longer arc for a moment on starting to prevent large drop of metal from shorting out the arc.



STRIKING METHOD

6. Learn to become proficient in the technique of striking an arc, then deposit short beads 4" to 5" long, by traveling from right to left and left to right then away from and towards you until uniform beads can be placed parallel to each other on a practice plate.

Course content

By applying themselves, students learn to make various types of groove welds in the flat position and fillet welds on lap and tee joints in the flat and horizontal positions, using single and multiple pass procedures with E6010, E6012, and E6020 electrodes. One lecture and practice period is devoted to showing students how to properly handle carbon-arcair gouging equipment.

Another period is spent on acquainting them with oxy-acetylene burning and gouging methods. Three periods are spent in discussing, demonstrating, and practicing welds in the vertical, horizontal, and overhead positions. No attempt is made to develop a high degree of skill in position welding during this short course.

On-the-job training

The welding engineer in charge of training spends a portion of his work day contacting different welders and trainees on the job to assist them and to check on the quality of their work. This follow-up program is especially helpful in keeping a check on the trainees, as only a great many hours of actual welding will develop a top production welder. This periodic check serves to develop good welding habits and to correct bad ones.

Gouging and burning are included in the course because a versatile man who can weld, burn, gouge, read blue prints, fit up fabricated assemblies, etc., is more valuable to the company than a man who specializes in welding only.

Practice booth

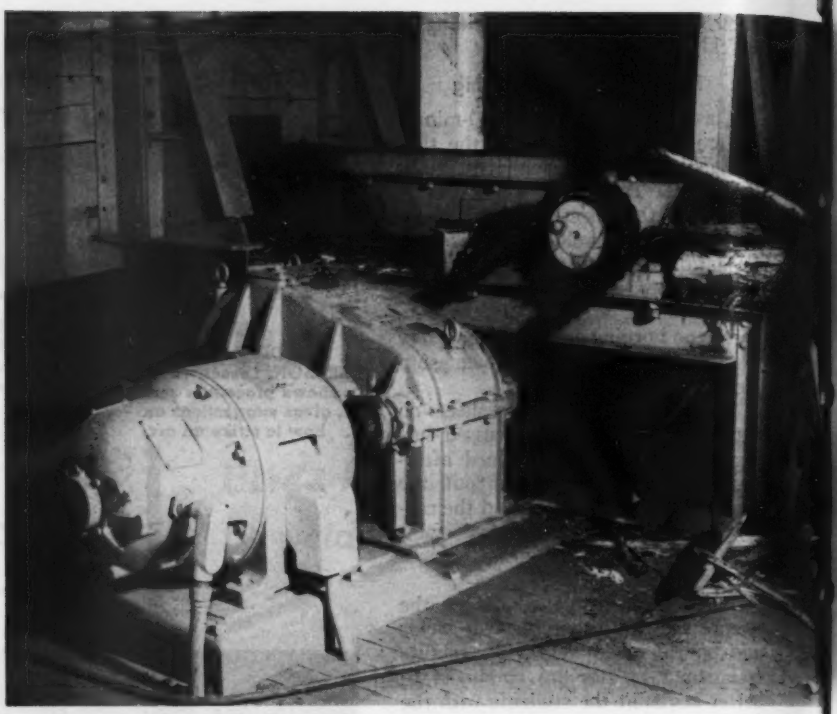
Welding booths have been provided and all welders and students who have completed the six-week course are encouraged to stay after work to practice on advanced welding tests. When enough welders want to practice position welding, one or more experienced supervisors stay after work to help them with their individual problems.

Welding library

Finally, to help the welders get better acquainted with their work and keep up-to-date with developments in industry, they are encouraged to use a welding library. This library contains texts on welding, welding handbooks, periodicals on welding, literature and pamphlets on company products and other reference material. Men may check out any of this material for home study.

Success of this training program at Chicago Bridge & Iron Company's Salt Lake City plant has promoted similar programs being used in other plants and erection district warehouses.

MERITS or faults to be found in the practice weld (inside the ring) are pointed out to the trainee by the foreman. Limiting each class to a dozen students gives the supervisors opportunity to devote careful attention to each individual and insure his getting off to a good start.



A HIGHLY COMPETENT herringbone gear speed reducer which drives a conveyor between the cutoff saw and the headsaw carriage in a lumber mill of the Pacific Northwest.

All about SPEED REDUCERS —HELICAL AND HERRINGBONE

This second of three installments tells how they work and what they are used for

FIRST OF THIS SERIES of articles explained just exactly what speed reducers and increasers are and indicated a few of their uses.

Chain and V-belt drives interposed between a driving motor and a geared speed reducer were discussed, with the advantages and disadvantages listed.

Single and multiple-stage reduction was explained, as well as problems on reducer lubrication.

Maintenance and cooling methods for reducers were considered and the article ended with a dissertation on the advantages and disadvantages of worm gear reducers.

* * *

HELICAL gear speed reducers have teeth extending across the gear faces and pinions in the curved line of a helix. A 30-deg. helix angle is the one chiefly used.

Since a plural and uniform number of teeth is in contact in a helical gear set at all times, operation is much smoother than with spur gears. However, considerable end thrust is present in the gear shafts. Manufacturers therefore find it necessary to provide bearings adequate for receiving this thrust.

Helical speed reducers are provided by some makers in single, double and triple reduction units, and in many sizes. One line observed incorporates 42 different sizes, covering a ratio range extending from 2.08 to 1 at one extreme to 360 to 1 at the other.

One axis for two shafts

Double and triple reduction units of helical-gear type can be and are made by different firms in such manner that input and output shafts have the same axis, being arranged in a straight line. This is a particularly compact arrangement which saves considerable space.

These units transmit power from any prime mover, whether electric motor, steam turbine, or gas or diesel engine. Models are obtainable from some sources that can be mounted on the side wall or suspended from the ceiling.

Double reduction unit

Helical gears, as well as spur gears, are sometimes teamed up in the same speed reducer with a set of worm gears, to make a double-reduction unit. At least one firm provides a combination vertical worm and spur gear speed reducer. This one has been developed for a special purpose; that of driving overhead chain conveyors.

Reducers with uncased spur gears are different from most reducers in that only the worm gearing is enclosed in the gear case. A spur pinion and gear driven from the worm gearing operates outside.

Spur gear ratio is 5 to 1 in every case, but worm gear ratios on different models extend over a range from 9.5 to 1 at one extreme to 58 to 1 at the other. This results in a total ratio

change extending from 47.5 to 1 at one extreme to 290 to 1 at the other.

Within this range are five different sizes of units with different capacities. Any unit may be used in combination with a variable speed transmission.

Right-angular application

The above reducer is a right-angular application. That is, the input shaft is that of a horizontal-axis worm, while the output pinion shaft and its mating spur-gear shaft are vertical. The right-angular or corner-turning principle is available in worm-helical enclosed gear drives, or in any other speed reducer which combines a worm gearing reduction set with a reduction set of another type.

Worm helical reducers, made by different firms, are much used on mixers, agitators and similar equipment. Higher efficiencies are obtainable on given high ratios of speed change than can be obtained with worm gearing only, since a large proportion of the desired speed change is effected through the helical gear set.

Some highly-developed worm helical reducers are equipped with oil pumps. These reducers have housings which contain fairly large radiation areas, in addition to having an oil reservoir of considerable size. The oil pump provides lubrication for the bearings in the housing cover of these vertical units, as well as for the helical gear set.

The pump is mounted on the rear worm bearing cover plate, and is driven directly from the worm. This allows operation at most efficient pump speeds. Necessary suction and discharge piping for the oil is all contained within the gear housing, so it is not unsightly. A pressure gauge is incorporated in the connection, by means of which proper pump operation may be easily and visually checked.

Some helical worm gear reducers have both their input and output shafts horizontal, though at a right angle to one another. These units, as provided by one builder, are equipped with flanges on their housings, allowing them to be directly attached to equipment such as screw conveyor troughs.

Herringbone gear reducers

Herringbone gear reducers are popular with many manufacturers and are highly efficient. Such gears are sometimes referred to as double-helical gears. Opposed arrangement of the double helix angles balances or cancels out thrust in such a manner that no side thrust occurs. Such gears must be accurately made and precisely aligned on the centers of their faces.

Because there is no side thrust, there is no distortion, and smoother action results. This, together with the fact that a number of teeth are always in engagement at the same time, makes them quieter than any other type with the possible exception of worm gear units. However, herringbone gear reducers might be considered a natural complement of worm gear reducers, since, while they are applicable for light duty, their chief use is for heavy duty.

Put to important uses

There are branches of industry in which herringbone speed reducers are of tremendous importance. The heart of an oil field pumping unit is the geared reducer, generally considered to be one of the toughest gear applications to be found. Yet there are firms providing herringbone gear speed reducers that have given a splendid account of themselves in such service.

It should be observed that speed increasers are also used to some extent. These are herringbone gear units. It is obvious that for increasing speed the larger-diameter gear must drive the smaller one, and this imposes a handicap on the gearing, power-wise, in proportion to the ratio in which the speed is stepped up. For the most part, speed increasers of this kind are found interposed between diesel engines and centrifugal pumps, or for similar duties where the load is of uniform type, so that there is no danger of further handicaps being imposed.

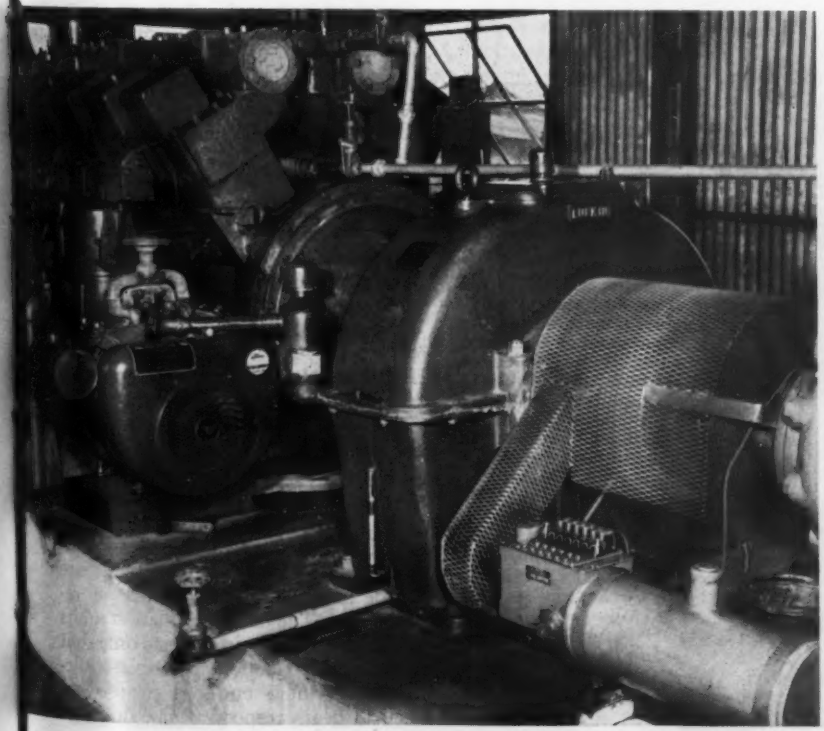
Speed increaser application should be made with great care. A number of builders of herringbone gear reducers also supply increasers, and their advice concerning them will always be found dependable.

Single-double-triple

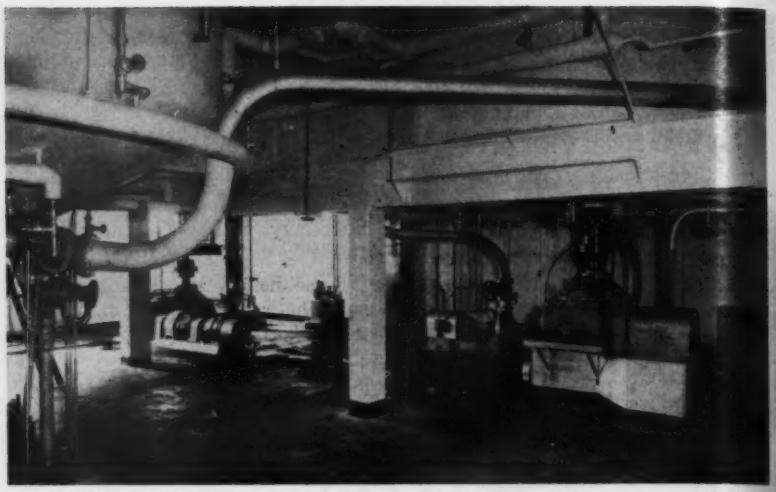
Herringbone gear reducers are available in single, double and triple reduction models. It is a relatively simple matter to make double-reduction herringbone reducers on the straight-line principle, so input and output shafts have a common axis.

Some firms make a full line of herringbone reducers with both reductions of the double-reduction units and all three reductions of the triple-reduction models progressive, in the same direction. They also make double-reduction herringbones of the straight-line type. Gears used in herringbone speed reducers are usually of the Sykes-generated, continuous tooth type.

In order to maintain symmetry in design, and secure balanced load, many excellent double-reduction and triple-reduction herringbone reducers use only one set of herringbone gears. Balanced pairs of opposed helical



A HERRINGBONE gear speed increaser through which the Climax engine at the left drives a Fuller pump at the right.



TWO VERTICAL-TYPE worm-helical speed reducers are driving rice cooker and lauter tub for a large San Francisco brewing company. This particular drive is arranged for two-speed operation.

gears are used in the first reduction on a double-reduction unit of this kind, and on the first two reductions of a triple-reduction unit. This process is reversed by some manufacturers, who use a pair of helical gears for the final reduction.

Other right-angular reducers

Speed reducers of combination herringbone and worm gears provide right-angular power delivery, the same as any other reducer incorporating worm gears. Inclusion of herringbone gears allows a relatively high speed ratio to be incorporated without suffering the efficiency loss inherent in a worm gear alone. Such reducers are available to deliver power both horizontally and vertically.

Where relatively low speed ratio is desired in a right-angular speed reducer, there is an additional type, which makes no use of worm gears. This unit has a set of spiral bevel gears. One firm provides such reducers in ratios ranging from 1.1 to 1 at one extreme to 6.1 to 1 at the other, and in horsepower ratings from .14 to 280.

Such reducers are available in either horizontal or vertical power-delivery models. Vertical units may have their slow-speed shaft extending either upward or downward, as desired. There is also a highly efficient line of spiral bevel gear speed reducers that has been specially designed for driving cooling-tower fans.

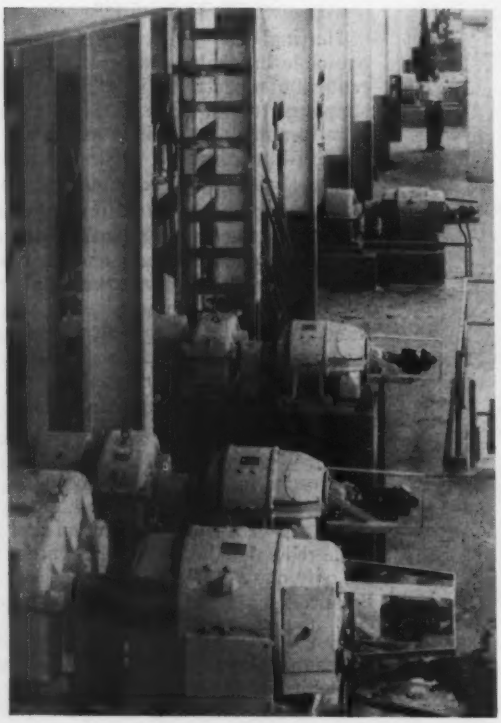
Many horsepower ratings

All of these have their input shaft horizontal, and their output shaft, on which the fan is mounted, extending vertically upward. Available in a large range of horsepower ratings, this line of reducers has a ratio range beginning at 1.5 to 1, and extending upward to 6 to 1 on the lighter models, though some of the larger units are 9.17 to 1.

Since spiral bevel gears are employed in right-angular speed reducers, one might wonder whether such gears are combined with other gear types for plural-reduction units, to retain the right-angular feature at higher speed ratios. The answer is that several manufacturers' spiral bevels are combined in the same unit with herringbone gear reductions.

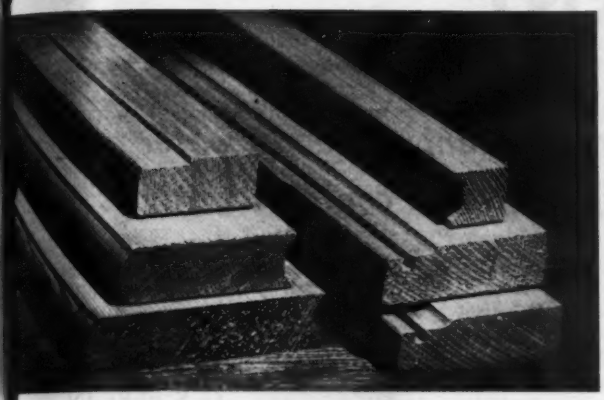
One of these makes horizontal drives of this type of gear combination in a ratio range beginning at 6.1 to 1, and extending up to 45.1 to 1. Spiral bevel gears are used at the input and the herringbones at the output. This line of reducers is in double series only. However, one manufacturer makes spiral-bevel herringbones in both double and triple series, the triple-reduction units using one set of spiral bevels and two herringbone gear reductions.

Spiral bevel gears are also combined with helical gears in one excellent line of right-angular reducers. Both horizontal and vertical-delivery units are made in single, double and triple reductions. The single-reduction units contain a set of spiral bevels only, but the double-reduction and triple-reduction units have one and two sets of helical gears respectively.



ASSORTED HERRINGBONE gear speed reducers are used for transmitting power to paper making machines in a large Pacific Northwest paper mill.

DESCRIPTIVE NAMES SHOULD REPLACE LUMBER GRADES



THESE are finish items, patterned grades from various types of work where appearance is important. Any of the four West Coast woods, Douglas fir, West Coast hemlock, Western red cedar or Sitka spruce, lend themselves to fine finish lumber manufacture.

WEST COAST lumbermen long have been concerned with the obvious need for improving and modernizing some of the old-time methods of marketing their products.

This problem was uppermost in our minds when the West Coast Lumbermen's Association started out a year ago to explore possible new ideas, new techniques and new methods aimed at improving lumber distribution.

It was obvious that we would take a long look at our lumber grading rules. In theory, lumber is graded according to intended end use. However, through the years, the industry has adopted arbitrary numbers for various grades of lumber. These grades were not particularly explanatory. Calling structural grades of Douglas fir and West Coast hemlock "common" has been a source of constant annoyance. So have some of the other grading designations.

Study aims

Our Association has made a year-long study of grading rules. The study has been aimed at discovering, if possible, a satisfactory method for (1) reducing the number of grades, (2) substituting names for numbers on some grades and (3) encouraging more universal grade marking.

Under the direction of H. V. Simpson, executive vice president, our Association staff has talked with leaders among lumber retailers, wholesalers, other distributors and manufacturers to get their ideas. The staff has attempted to get facts on how lumber is sold in retail yards. As a result of their work, it has been found that most retailers feel that there are too many grades, more than they can sell. So in most cases No. 1 and 2 boards and dimension go into the same bin and are sold as the same grade.

Retailers are strong in the belief that we condemn our lumber by giving it numbers instead of names. They believe that naming lumber would be more descriptive and would encourage grade marking. Such practices would ease their selling job.

The sum total of a year of exploration can be summarized in several proposals which are now under study by a competent committee of lumbermen members of the West Coast Bureau of Lumber Grades and Inspection. These men have been asked to study thoroughly all suggestions regarding possible revision of present grading rules and methods covering West Coast species.

Suggestion for 2-in. grades

One suggestion in 2-in. dimension grades would leave "select structural" as is; Numbers 1 and 2 would become "structural"; No. 3 would be "construction"; and No. 4 would be called "utility".

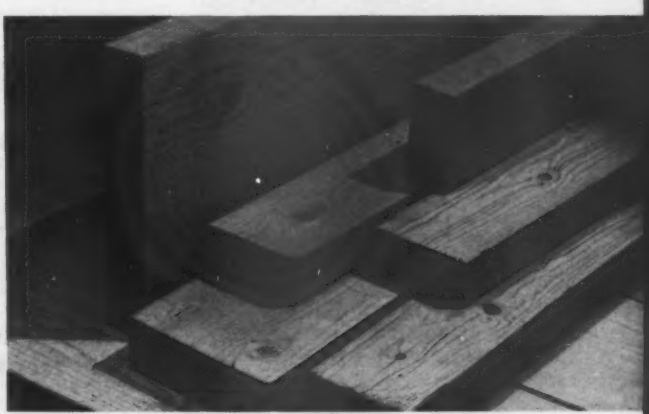
In designating the names of boards, "select merchantable" would remain unchanged; Numbers 1 and 2 would become "merchantable"; No. 3 "construction"; No. 4 "utility". In the clear grades, B & Better and C would be changed to AAA, D would become AA, and E would carry a new A grade. These proposed changes would accomplish the several improvements suggested by our retail friends, namely: reduction of the number of grades, calling grades by names more indicative, and giving lumber names which would help stimulate sales.

However, the industry is not yet far enough along in the exploration and study of grading rules changes to report a crystallization of thinking. We are still in the think and ponder stage.

The plain truth of the matter is, there certainly is a better way to merchandise lumber than we are using today, and we propose to find it.

By
G. E. KARLEN
President, West Coast Lumbermen's Association
(Managing Partner Eatonville Lumber Co. Tacoma, Wash.)

THESE COMMON grades of lumber are intended for construction. The lumber is graded for its strength and stiffness rather than its appearance. Allowable characteristics in these grades include various knot sizes for various size pieces as well as other characteristics which do not detract from lumber strength.



FUME CONTROL BY WATER TREATMENT

Kaiser's water treatment plant conserves water and minimizes waste disposal while controlling fumes

A LARGE water treatment plant to conserve water and to minimize waste disposal has been installed as an important part of an extensive fume control system that is in process of completion at the Mead Reduction Plant of the Kaiser Aluminum & Chemical Corporation located near Spokane, Washington.

The system is designed effectively to prevent air pollution that is attributed to aluminum reduction facilities and at the same time to provide greatly improved working conditions for the reduction plant operators.

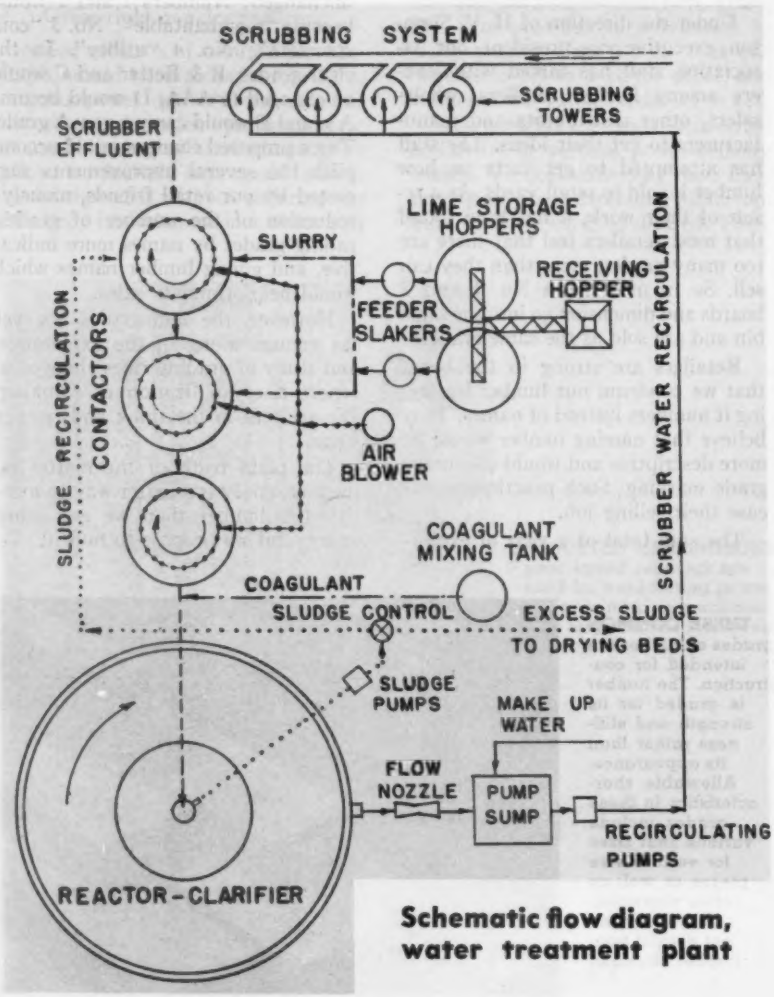
By
G. S. FERGIN
Development Engineer
Kaiser Aluminum & Chemical Corp.
Mead Works

Prior to the installation of this system, the Division of Metallurgical Research made an intensive study to evaluate the effect of reduction plant gases on surrounding vegetation. This work and the company's recognition of its community responsibilities led to a comprehensive program for the development of an efficient gas collection and scrubbing system.

A contract for final design and construction of the fume abatement system was made with Kaiser Engineers, Inc., of Oakland, Calif.; and they subcontracted the major items of mechanical equipment for the water treatment plant itself with Process Engineers, Inc., of San Francisco. The main objective of the water treatment plant is that of decontaminating scrubber waters for recirculation to the gas washing towers in order to conserve water and to provide for waste disposal.

Good location

Mead is fortunate in being conveniently located over a vast subterranean river from which it draws its water supply. This great river of ground water also supplies the city of Spokane and its 170,000 inhabitants. From the south end of Lake Pend Oreille this ground-water stream flows southwest through a porous formation of glacial till for 50 miles to Spokane, its water surface dropping



Schematic flow diagram, water treatment plant

160 ft. over this course. The major source of this flow is seepage from Pend Oreille Lake with smaller quantities from lowland plains and from Coeur d'Alene Lake.

The underground stream has an estimated flow of about a half billion gallons per day. Water limitations, therefore, are not a problem at Mead; but due to the high costs of drilling new wells and of pumping, and also the problem of waste disposal and stream contamination, water treatment and recirculation are a necessity.

Water is drawn from four 200-ft. wells which have a combined capacity of 6,300 gal. per min. The major portion of this water is utilized in heat exchangers for cooling rectifiers that supply direct current for the reduction of alumina. Another large amount is consumed in spray coolers which assist in potroom and carbon baking room cooling. This water is not recirculated but is run to a settling pond and then flows to a near-by stream.

Pumping capacity

The water treatment plant has a pumping capacity of 6,400 gal. per min. or 9,200,000 gal. per day. Actual water consumption is only 3 to 5% of this figure, or about 200 to 300 gal. per min. make-up, depending on seasonal temperature variations. These losses occur by evaporation caused by the passage of hot gases through the scrubber spray pattern and from sludge removal. A closed system of this type thus permits efficient use of water and chemicals.

Fluoride bearing gases from the aluminum reduction cells are collected by means of a hooding system and drawn through a maze of ducts into cylindrical scrubbing towers. These towers are constructed of California redwood in order to resist corrosive and abrasive attack from the gas constitutents. Four towers in parallel are fed by a fan drawing 158,000 cu. ft. per min. of gases from each potroom.

Spray nozzles mounted on a central column deliver a series of cone sprays directed toward the periphery of each tower at a rate of 100 gal. per min. Gases enter the towers tangentially at the bottom and pass through the liquid spray pattern in an upward spiral motion. Gaseous fluorides plus fine particulates of alumina, cryolite and carbon are absorbed by the sprays and removed from the gas stream by centrifugal action. The absorbed fluorides form acid constituents in the scrubber water that lower its pH to a value of approximately 3.0. The scrubber effluent drains through a side outlet at the bottom of the towers and flows by gravity through a redwood conduit to the water treatment plant.

En route

General operation of this system is illustrated by the schematic flow diagram. The scrubber effluent passes in series through three rubber-lined process contactors 30 ft. in diameter and each equipped with a high capacity mechanical mixer. Water enters at the top of the first contactor, passes into the second contactor through a bottom flume and into the third contactor through a top spillway.

The flow leaves the bottom of the third contactor and enters the center well of the reactor-clarifier. The clarifier unit measures 125 ft. in diameter and encloses a 50-ft. diameter reactor compartment in the center. The precipitated sludge is removed from the bottom of the clarifier and the clear treated water flows over the top into a pump sump, where it is recirculated to the scrubbers.

Blending lime or limestone with the acid bearing liquids for primary acid neutralization is the function of the three contactors. The system is designed for chemical treatment with combined lime and limestone or with lime alone. Experience has shown that when a combination of lime and limestone is used, a fine precipitate is produced that is difficult to settle. The reaction rate of limestone is very slow, which causes a materials waste and sludge overload.

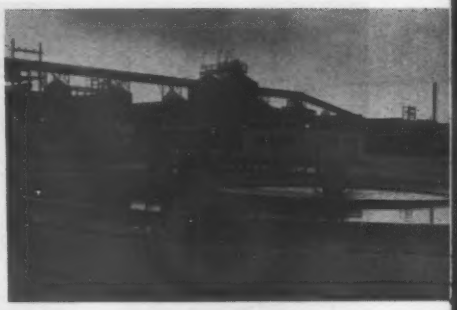
The lime treatment

Observations have indicated that when lime alone is used for neutralization, the particle size developed is appreciably larger, and at low rates of flow flocculation is sufficient to preclude the necessity of using a coagulant in order to produce a well-clarified water. Therefore, limestone additions have been discontinued and the use of lime alone is now practiced.

Lime slurry, prepared from powdered quicklime, is added to either or both of the first two contactors depending on the chemical requirement. Quicklime is held in storage hoppers and is fed by gravimetric-type scale feeders into continuous lime slakers. The lime slurry overflows the slaking compartment and enters the neutralization tanks, where it is intensively mixed with the acid flow.

Aeration and supplemental mixing are provided by air blown through a ring pipe system circling the bottom of each contactor. Aeration minimizes the possible build-up of undesirable salts by removing the carbon dioxide absorbed in the scrubbing process. If not removed, this carbon dioxide would have a lime demand and thus

Continued on page 53



PUMP HOUSE and chemical storage tank are behind the 125-ft. diameter reactor-clarifier. Portions of the ductwork can be seen leading to potrooms in background.

Pump house serves as water treatment plant's brain. Operator adjusts one of the 3,000 gal. per minute recirculating pumps which control flow to scrubbing towers.

ACID BEARING scrubber effluent is neutralized in three 30-ft. diameter contactors. Close control of lime additions brings solution to right pH before it passes into the clarifier in background.

GRAIN SIZE CONTROL CAN REDUCE REJECTS

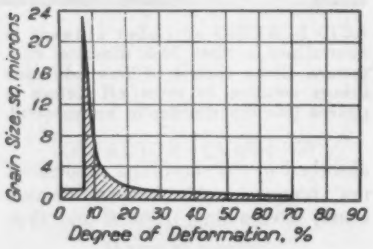
How one firm solved the problem of fabricating aluminum alloy sheets without surface fractures

ONE DIFFICULT metal fabrication problem at AiResearch Manufacturing Co., in Los Angeles, was overcome when the metallurgical department diagnosed the cause and designed a cure.

Normal processing of aluminum alloy sheets (61S) for oil cooler shells contributed to development of surface fractures in spots where the metal had been formed on hydraulic presses and brazed or welded.

This is what happened: Forming of the metal in a hydraulic press resulted in excessive grain growth in certain areas. Surface fractures in those areas began to show up in completed coolers, and something had to be done immediately or oil leaks would develop in the aircraft depending upon those units.

GRAIN SIZE at 950 deg. C. in low carbon steel depends on degree of deformation. Aluminum alloys behave similarly.



Investigation by Block

Harold Block, chief metallurgist, investigated. He suspected that where the metal had been formed, the metal grains were considerably larger than normal. After forming, when the heat of welding or brazing had been applied, cracks would appear and start to run around the boundaries of the larger grains. However, when the cracks encountered the smaller grains of unformed metal, they stopped.

The following is an account by *Western Industry* editors of Mr. Block's report.

It has long been recognized by metallurgists that heating subsequent to plastic deformation produces recrystallization and grain growth. Heating subsequent to relatively low percentages of deformation or cold reduction causes the development of excessively large grains in the metal. Larger percentages of cold reduction do not produce large grains, and may even produce some grain refinement.

The magnitude of cold reduction which, upon subsequent heating, causes excessive grain growth is referred to as the "critical" percentage. In most forming and drawing opera-

SUPERFICIAL surface hardening of aluminum alloy sheet on three-roll power roller is demonstrated.

***IN REVERE ALUMINUM EXTRUDED SHAPES* YOU GET**

30 years' experience

Revere experience means this in the production of extruded shapes—you get metal with exactly the properties agreed upon, in strength, workability and surface finish. You get shapes of uniform dimensions, held to specified tolerances. You get full cooperation in planning and producing the shapes for the specific requirements of your production processes. This is accomplished by Revere Quality Control procedures with the help of the Revere Technical Advisory Service.

These advantages come from Revere's long experience in producing Aluminum Extrusions, dating from 1922. Now you can obtain Revere Extruded Shapes from Revere's new mill in Los Angeles at a saving in delivery time and shipping costs.

Revere Aluminum Extruded Shapes are available in Alloys 61S, 62S and 63S. Revere produces seamless drawn Aluminum Tube in Alloys 3S, 24S, 52S, 61S and 63S. Modern heat treating facilities make possible a full range of properties to specification. Revere also makes Aluminum Electrical Bar and Forgings.

Call the nearest Revere office today.

**Now made on the Pacific Coast as well as in Revere's Baltimore mill.*

REVERE ALUMINUM

REVERE COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, N. Y.

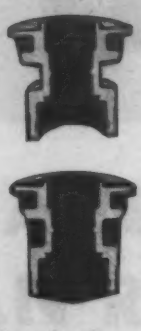
• • •

Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y.

Sales Offices in Principal Cities

LOS ANGELES: 6500 East Slauson Ave. Underhill 0-3331
SAN FRANCISCO: 116 New Montgomery St. Sutter 1-0282
SEATTLE: 1331 Third Ave. Main 1401

SAVINGS



in freight

AmForge Upset wt.—41 lbs.
Old method wt.—63 lbs.

Here's a contrast! Compare the AmForge product, which adheres closely to the contour of the finished part, with the solid hammer forging. Our customer saved 22 lbs. of stock on every piece, freight on over 50 tons of steel, and machining on order of 4600 pieces.

in machining

AmForge Upset weight—12 lbs.
—saved 66% in machining time!

Our customer switched from turning this piece out of bar stock weighing 30 lbs. to AmForge upset and now gets forging as shown, saving stock, freight and 66 per cent of the machining time. The square forged hole fits his gauge without machining for maximum savings.

in material

AmForge Upset saved
$14,000 in material alone!

AmForge piercing and forging of this rear axle housing saved our customer 340 tons of steel on an order for 136,000 units. He also saved freight on this tonnage and reduced machining to a minimum. This is an example of how AmForge cuts costs, gives you better quality.

through modern metallurgy applied to the
latest upset and press forging methods at

AMFORGE

AMFORGE's new Upset and Press Forging facilities at Azusa, California, utilize the latest in forging techniques.

To see how AmForge can help you, send a blueprint, sketch or sample unit for engineering study—no obligation, of course.

AM FORGE DIVISION

AMERICAN Brake Shoe COMPANY

AmForge Division

109 N. WABASH AVENUE, CHICAGO 2, ILLINOIS

PLANTS: AZUSA, CALIFORNIA • CHICAGO, ILLINOIS

ELLIPTICAL oil cooler shows critical areas of grain growth in aluminum alloy sheet used for the shell.

tions on sheet metal the amount of "stretch" or cold reduction is not uniform, but varies from one point to another. Consequently, subsequent heating will naturally cause excessive grain growth in the areas which have been "critically" deformed.

If forming is to be performed on fully annealed stock, subsequent heating will naturally produce large grains in some areas. On the other hand, if sheet metal which has previously been rolled to produce a partially work hardened temper is deformed or drawn, the sum of the initial and final reductions will be outside the "critical" range; grain size won't be excessive.

It has been observed that when aluminum sheet is welded or brazed, there is a propensity for cracks to appear at the boundaries of large grains. The cracking may progress unobstructedly along the boundaries of the large grains. However, the progress of cracking is effectively ended when the cracks run into a region of fine grains where further progress would demand more frequent changes in course.

The problem at hand was analyzed in the light of these considerations. The manufacturers of the aluminum sheet suggested the use of ⅛ hard sheet instead of annealed stock. This expedient would undoubtedly minimize the amount of grain growth in certain areas. However, the suggestion was rejected because it would make some forming operations more difficult.

Where cracking starts

It was known that the cracking originated in the surface layers of the sheet, and it was felt that a superficially work-hardened layer would produce some benefit.

What was wanted was sheet stock with the properties of 61S, but with hard surfaces and a soft center core.

This was achieved by the application of known metallurgical processes in the firm's sheet metal shop.

Cut aluminum sheet to be used for oil cooler shells was given superficial surface hardening by running it through a three-roll power roller. The process had little or no effect on the center of the sheet.

Three times and out

It was found that three passes through the roller, each time changing the direction of the arc, was sufficient in some cases to control the grain for subsequent fabrication processing, depending, of course, on the degree of deformation to be applied.

This latter factor, incidentally, has a direct relationship percentage-wise to grain size. The critical area for grain growth appears in deformation running in the neighborhood of 10%. Beyond that percentage, the growth factor decreases rapidly, being less, for example, at 40% than at 20%.

In its surface hardening process, it was found that the larger the arc used in passing the sheet through the roller, the harder the surface.

The problem centered in the bulges on the outer shell of certain types of its oil coolers, particularly in the area where valve connections were made. Again, the degree of cracking was dependent on the amount of grain growth resulting from the degree of stretch applied to the metal.

NO PALLETS NEEDED WITH GRIPPER ARMS

NEW TYPE of gripper arms for lift trucks which can be used without pallets, gripping loads from the sides so that no bottom support is needed, has been developed by Shell Oil Company. Part of the work was done at Emeryville, Calif.

Shell's major use of the new attachment is in handling drums and packages. The same set of arms can handle both types of loads, giving the device wide versatility.

Friction uniformly distributed over a relatively large area, rather than localized pressure, provides the main force, allowing the handling of larger loads without crushing. The lifting effectiveness of the friction factor is raised by special shaping of arms, plus corrugated facings where they come into contact with a load.

The arms are flexible, and are shaped to provide for the first time a sufficiently firm grip to hold loads safely despite abrupt stops. Previously, loads tended to slip forward and fall when sharp stops were made.

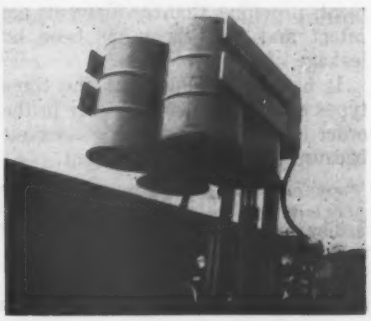
Up to nearly two tons can be handled by the largest type of attachment developed. That one handles four 55-gal. drums or the equal in cases, quarter drums, kegs and pails.

The new gripper arms were developed to cut Shell's distribution expenses. Elimination of wooden pallets would save Shell between $250,000 and $750,000 a year for replacement and upkeep alone. Pallets also take a heavy toll in waste freight and warehouse space, and in labor for manhandling.

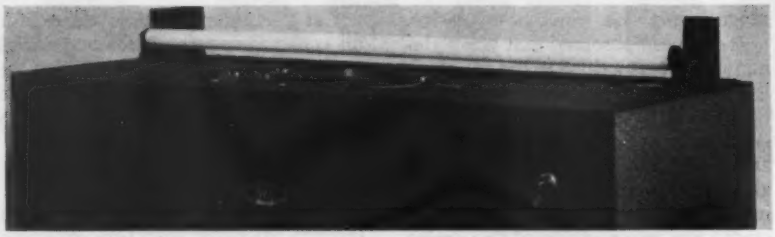
In its initial study of the whole distribution problem, Shell concluded that palletless handling was preferable, but tests proved existing gripper arms unsatisfactory for several reasons. Not only did they have to be changed for different types of loads, but the thickness of the arms necessitated leaving large gaps between loads, thereby wasting warehouse and freight space.

The attachments are expected to be on the market for general use within several months, produced by manufacturers licensed by Shell. Development of the arms started several years ago as a project of Shell's marketing operations department. The Elwell-Parker Electric Company of Cleveland, Ohio, constructed the attachment, through several phases, under Shell's guidance.

CARTONS held safely and harmlessly (above); drums stay in place (below). Sharp stops do not make loads slip forward and fall.



NEW LIFE for OLD LAMPS



FLUORESCENT tube reconditioner.

UP TO 50% of discarded fluorescent lamps currently being relegated to the local dump can now be given new life when processed in a fluorescent tube reconditioner.

This machine has been developed by National Re-Light Corp., and consists of a metal box 18 in. square and 50 in. long. Since the machine first went into use in April 1952, it has attracted the attention of plant maintenance experts all over the world. Reports indicate that from 10 to 90% of fluorescent lamps may be rejuvenated depending upon the maintenance policies of the companies which discarded them.

A fluorescent lamp is a glass cylinder coated on the inside with a phosphor and containing a gas that is primarily mercury vapor. Plastic bases, sealed onto the ends of the cylinder, project small filaments into the lamp. Prongs sticking out from these bases hold the lamp in the fixture and transmit electrical current.

A starter in the fixture kicks electrical current into the filament when the lamp is turned on. The current passing between the filaments through the mercury vapor produces ultra violet rays which in turn activate the phosphor, causing the lamp to give off light.

Lamp life is generally measured in hours of use, and usually estimated by lamp manufacturers at 7,000 hours. However, lamp life is actually governed by the number of times the lamp is turned off and on.

A lamp ceases to give light for one of three reasons: (1) The filament oxidizes; (2) the filament breaks; (3) gas leaks out of the tube. The National Re-Light machine can usually recondition tubes with oxidized filaments providing that the filaments are intact and that there has been no leakage of gas.

It has been found that the three types of damage usually occur in the order listed and most lamps burn out because of an oxidized filament.

How it works

The reconditioner first subjects the tube to two rapid tests: One is a filament test to determine whether the filament is still intact; the other is a conductivity test to determine whether the tube is still sealed against gas leakage and whether the filament is strong enough to take a recharge. These tests are accomplished by plugging the tube into the special socket and reading the test results off a series of dials and lights.

Knocks oxidation off

If both tests are positive, the tube is slipped into another socket and is "shot" with a high voltage pattern current. The effect of this high voltage current is to knock the oxidation off the filament. The lamp is then ready for service. An experienced worker can perform the entire operation in 15 seconds.

This process is not new as it has been used for many years to recondition worn out radio tubes and more recently television tubes. It has been tried unsuccessfully with incandescent lamps, which usually burn out again soon after they have been reconditioned.

Experience to date

Plant maintenance and conservation experts are applying three general yardsticks to the machine's performance.

1. How does the light output of the reconditioned lamp compare with that of the new lamp?
2. How does the life of the reconditioned lamp compare with that of the new lamp?
3. Assuming that the answers are positive on the first two counts, what proportion of a plant's burned out lamps can the machine recover?

Plant engineers have learned that a new lamp is relatively bright, and that it loses about 20% of its brilliance in the first 200 hours of operation. After that its light output decreases very slowly, perhaps only by another 10% in its next 5,000 to 6,000 hours.

Comparison tests have shown that reconditioned tubes never attain the brilliance of a new lamp, but that they begin their second life with an output equivalent to that of a new lamp after it has burned 200 hours. Reconditioned tubes seem to parallel the gradual decrease noted in new lamps after their first 200 hours. There is no sudden drop-off in candlepower which characterizes the early hours of a new lamp.

Insufficient time has elapsed since the first machine went into operation so that no positive statement about life span of reconditioned tubes can be given. It is known, however, that in Los Angeles several thousand of these tubes are still burning after 5,000 hours and only a negligible number have gone out of service. Controlled tests are being conducted in several plants with banks of reconditioned tubes matched with banks of new tubes.

Life of new tubes varies considerably, depending upon how they are

FILAMENT of a fluorescent tube.

One-Stop shopping

for brass rod and bar

You can get rod or drawn bar of Chase Free-Cutting Brass, Copper or a wide variety of other copper alloys at one stop – *the Chase Warehouse nearest you!*

When you want free-cutting materials, it pays to buy Chase – for Chase rod and drawn bar yield the shorter chips that make for *easier machining, longer tool life.* They produce smooth, clean-surfaced products – less expensive to buff or polish before lacquering, enameling or plating.

And when it comes to re-ordering, remember that Chase alloys are uniform – repeat orders of the same alloy always have the same cutting characteristics.

Chase BRASS & COPPER

WATERBURY 20, CONNECTICUT • SUBSIDIARY OF KENNECOTT COPPER CORPORATION

• *The Nation's Headquarters for Brass & Copper*

LOS ANGELES 54, CAL. • 210 S. Central Ave., Tel. MAdison 6-0101
SAN FRANCISCO 7, CAL. • 680 Second St., Tel. GArfield 1-7780
SEATTLE 4, WASH. • 1957 First Ave., South, Tel. SEneca 1862
DALLAS 2, TEXAS • 119 Pittsburgh St., Tel. PRospect 4271
HOUSTON 1, TEXAS • 16 Drennan St., Tel. CApital 7266
DENVER 2, COLO. • 1706 Welton St. at 17th St., Tel. AComa 3685

used, frequency of turn-on and turn-off and maintenance. When the first batch of reconditioned tubes has gone out, there will be a need for further tests on the performance of re-reconditioned tubes. If successful, this would compound the initial saving effected by the machine.

Percentage of recovery ranges all the way from 10 to 90% and depends upon maintenance policies and practices. The longer a tube remains in the fixture after it has gone out, the smaller the chance it will ever burn again. A maintenance man standing on a stepladder and dropping dead tubes into a metal can is doing his best to make sure that none can ever be recovered.

Group replacement

National Re-Light advocates group replacement of tubes while the whole bank is still burning. Recovery has been highest where this policy has been put into effect. Any loss resulting from the removal of a bank of lights that are still burning is offset by the lower labor cost of changing all lamps at once rather than one at a time as they burn out.

Dirt can also cut down on candlepower. Tubes should be taken down periodically, at much shorter intervals than they need to be replaced, and given a thorough washing. Fixtures should also be cleaned and their starters replaced. These steps, equally important with new or reconditioned lamps, will pay for themselves in terms of candlepower per dollar.

WESTERNERS WIN strapping contest

THREE GRAND PRIZES were awarded during the recent judging session by Acme Steel Co. in its industry-wide flat steel strapping contest.

First grand prize, an all-expense trip to Bermuda for two (or $1,000), went to H. W. Davies of the Port of Port Angeles, Washington. Third grand prize of $250 went to Carter Anderson of Boeing Airplane Company, Seattle, Wash.

Fifteen additional cash prizes of $100 each were awarded to entries taking 4th to 18th place. The company received a total of 583 entries, each purporting to describe a successful use of flat steel strapping. Purpose of the contest was to bring to light any new ways in which flat steel strapping can be used to help all industry do a better job of packaging, shipping and handling material.

LOADED kiln trucks awaiting their turn in the modern dry kilns at a Western Pine sawmill. (Weyerhaeuser Timber Co., Klamath Falls, Ore.)

KILN DRIED LUMBER MEETS YOUR MARKET REQUIREMENTS

Controlled artificial seasoning is quick, practical, predictable . . .

LUMBER comes off the mill saws with a moisture content of from 35% to 200%. Before this lumber can be reliably used in any kind of construction, the moisture content must be reduced to between 5% and 20%.

Nature has her own way of achieving this seasoning, but it is a long and unreliable process.

Speedy seasoning

In these days of high production and fast-changing markets an artificial and rapid seasoning is replacing the air drying process, allowing mills to cut and dry lumber to satisfy a particular demand. This artificial seasoning is achieved through kiln drying.

Green lumber, when used prior to drying, will warp, shrink, bend and internally collapse. For construction purposes it is considered impractical for everything save dimensional uses and here it is used mainly to reduce costs. Wet weather can keep dry lumber off the market for months at a time, as was the case during our past wet spring and early summer. Kiln drying, on the other hand, permits seasoning of lumber no matter what the outside conditions. Some experts believe that the closely controlled process of kiln drying even surpasses the quality obtained through natural seasoning.

Basically, dry kilns operate by controlling air movement, humidity and temperatures in and around lumber being seasoned. All three of these elements are important to the process.

Methods

Most popular and economical types of dry kilns use heated air and forced circulation; the older types still use circulation caused by heating the air. In the more modern method, air is heated by being circulated by steam coils. Blower type fans are used in the

DRY KILN BATTERY at the Red River Lumber Co., Westwood, Calif., where 25 two-tunnel units are now in service, with five more under construction.

older mills, while disc fans with a velocity of 300 fpm. handle circulation in modern units.

Vent outlets are located over the lumber so that a maximum movement of air can be maintained and moisture-laden air exhausted. Intakes near the fans keep up the supply of dry air. Air vents are either hand or automatically operated.

Heating coils are generally made of one-inch black iron pipe running the full length of the kiln. They are usually divided into separate units or headers to provide uniform heat distribution throughout the kiln. To reduce resistance, heating coils often are finned, increasing radiating capacity as much as 400%.

Kiln chambers are long, narrow ovens with openings at one or both ends. There are generally six cribs, 100 to 120 ft. in length. For uniform drying, lumber is stacked in cribs with stickers or crossers placed on each layer of lumber. This provides space between boards for complete air circulation. Cribs may be stacked 9 ft. wide, perhaps 12 ft. high, with a maximum length depending on the length of logs being cut.

Charging the kiln

Stacked lumber is placed on kiln trucks, small lumber-bearing dollies which ride on tracks, and these are pushed into the kiln, normally six cribs deep. Another method of charging the kiln is to build lumber cribs in package units which can be carried by lumber carriers and lift trucks. Normal-size unit would be 54 in. wide by 4 to 5 ft. high, with lengths running 10 to 20 ft. These packages are then placed on green storage tracks where lumber is stowed before being taken into the kilns.

Still another method is in use by a few kilns today. This is called side loading. The side of the kiln opens and lift trucks charge the kiln directly by setting units on the floor and building to the proper width and height. Advantage of this method is that handling is cheaper, though down-time is longer. An hour is required to reload a kiln in this manner while other methods take only 5 to 10 minutes.

Once inside the kiln, lumber could be dried rapidly by merely heating it to 212 deg. F. and boiling all the moisture out. This, however, would result in severe internal stress causing rupture and surface checks resulting in heavy degrade.

Degree of humidity

In order to control drying speed, humidity within the chambers is maintained at a level slightly lower than the moisture content of lumber itself. The difference between the two conditions governs the rate of drying. Optimum drying speed varies among separate species of lumber, as well as for various thicknesses. In fact, all lumber taken from the same log may require different drying rates.

The heartwood, or drier portion of a tree, has an initial moisture content running in the neighborhood of 35% to 40%, while sapwood runs as high as 150% to 200%.

Boards are generally segregated on the green chain as to thickness and drying rate rather than grade. Grading is done on a dry chain after kiln drying. This insures equitable drying rates for all lumber being processed at the same time.

Rule-of-thumb

The general rule that may be applied for softwoods is: approximately one day of drying should be allowed for each quarter inch of thickness. This, of course, varies with the species of wood, growth conditions and quality of seasoning needed. Western softwoods are generally started at around 135 deg. and finished at 180 deg. F. Seasoning is carried on until the desired moisture content of the lumber is reached. Framing lumber should have 15% to 19% moisture content, crating and sheathing 12% to 15%, interior, clear finishes 8% to 12%.

Hardwoods, having greater density than softwoods, demand 5 to 10 times as long in seasoning process. Even in this controlled seasoning, stresses are set up between the inside and the outside of the board. A high temperature and high humidity steam treatment is given the lumber following its dry kiln run. In this period of from 4 to 20 hours the temperature is about 180 deg. F., with a humidity of 90% to 95%. This serves as a plasticizer and tends to equalize stresses. The stock is

DRY KILN fan and recording apparatus room.

Durasheath: saves needless power-line jointing

Why complicate cable installations by shifting from buried to duct or aerial types in industrial plant feeder lines? Flexible, easily handled DURASHEATH* Cable can cut your costs. You can run this tough, versatile cable underground directly in the earth, overhead or in ducts (or in any combination) without needless, time-consuming jointing. Its light weight and flexibility make duct pulling fast even in zero weather. Aerial assemblies go faster. Linemen like to work with it. You stock only one cable type — all-purpose DURASHEATH.

* * *

As one of several types of ANACONDA power cables, DURASHEATH is available in all sizes, single or multi-conductor, copper or aluminum, from 600 to 15,000 volts. It is thoroughly dependable for industrial plants, railroads, series or multiple street lighting, airport† lighting, residential primaries and secondaries, as well as for such uses as Type USE cable for underground service entrance. *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.*

*Reg. U. S. Pat. Off. 53312

ANACONDA®

Primary and secondary distribution cables • building, machine tool, control and communication wire • portable cords and cables • bus-drop cables • apparatus cables • copper, aluminum, copperweld conductors • wire and cable accessories.

†*When ordered to CAA Specification L-824*

ANACONDA ON THE PACIFIC COAST: Plant at: Orange, Calif. District Offices at: Los Angeles, Calif.; San Francisco, Calif.; Seattle, Wash.

then allowed to cool from 12 to 24 hours before subsequent machining.

Kiln equipment varies in cost, but modern units holding from 40,000 to 100,000 board ft. cost from $350 to $700 per 1,000 board ft. holding capacity. This does not include boiler plant and fuel storage equipment. Most plants use steam heat developed by utilizing log slabs and edging material produced during the lumber manufacturing process.

Many plants without their own power units use a recently developed heating unit which automatically burns natural gas or fuel oil in an external combustion chamber. In these direct-fired kilns, products of combustion are blown directly into the kiln chamber and thus transfer heat directly to the air without using the piped heat exchanger.

Use of dry kilns in lumbering seasoning has provided year-round stability to a large part of America's lumber supply. Through carefully controlled processes, it has allowed many mills to quickly produce quality lumber on a continuous basis.

GEIGER COUNTER ON DIESELS
wrist pin wear studied

INFORMATION about the wear rate of a wrist pin on a diesel locomotive of the Denver and Rio Grande Western Railroad is being developed by the use of a Geiger counter installed by men from the Berkeley, California, laboratory of Tracerlab, Inc. Standard Oil Co. of California is cooperating in the study.

The 7-inch steel wrist pin was radioactivated at Brookhaven National Laboratory and installed in the Rio Grande's freight engine No. 5584. It links a piston with a connecting rod. Each time the engine turns over, a few atoms of steel rub off the pin and enter the lubricating oil in which the unit is bathed.

Ordinarily too few to measure, these atoms can be quickly and accurately counted when they're radioactive because they react on the Geiger counter. The counter, located in the crank case, feeds its information to a chart recorder in the cab which is under constant supervision of the crew.

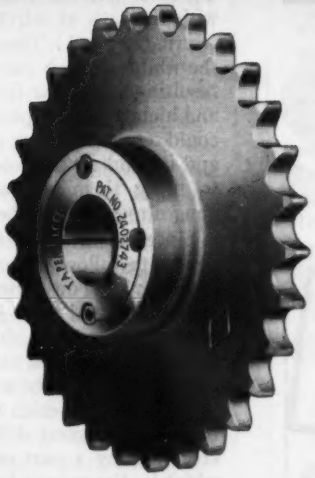
At the end of each run the chart is removed and checked. "We ought to learn a lot of new things not only about wear, but about dust and oil filter efficiency," says Ray McBrian, head of the railroad's research laboratory.

DIAMOND

ROLLER CHAINS AND SPROCKETS

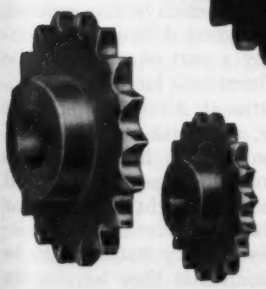
A balanced stock meets requirements for all standard drive ratios and popular H. P. capacities*

* ROLLER CHAIN and SPROCKETS, Bushed and Fixed Bore



BUSHED SPROCKETS

With the Taper Bore Sprocket and Bushing, the bushing is changed to meet various bore sizes.



FIXED BORE SPROCKETS

Small size Diamond finished fixed bore stock sprockets (with keyways and setscrews) give the distributor the balanced stock to meet the widest possible chain drive requirements.

STOCK SPROCKETS FOR ALL POPULAR SHAFT SIZES

(Taper Lock and Fixed Bore Types)

The Diamond Chain combination of roller chains, taper bore sprockets and bushings, and the fixed bore sprockets in the small sizes provide for emergency and normal service demands for all standard drive ratios and popular horsepower capacities.

Take advantage of the "over-the-counter" availability of this Diamond stock of Chains and Sprockets for new applications and replacements. This stock is as near as your telephone. See the yellow pages of your classified telephone directory for the address of the Diamond Chain distributor.

DIAMOND CHAIN COMPANY, Inc.

Where High Quality is Traditional

Dept. 606, 402 Kentucky Ave., Indianapolis 7, Indiana

Offices and Distributors in All Principal Cities

Catalog 753 Mailed on Request

MATERIALS AGREEMENT NEEDED IN JET PROGRAM

ON February 23, 1927, Charles Lindbergh arrived in San Diego, California, with a burning desire to be the first human being to fly the Atlantic Ocean non-stop. There was feverish excitement in the Ryan Airlines camp for the next 60 days, and the uppermost thought in the minds of all concerned was to build a plane, with the least possible delay, that would hold together for a 30- to 40-hour flight without refueling.

By L. D. HIBBARD
Material Planning Supervisor
Ryan Aeronautical Co.
San Diego

Was materials a problem? Definitely so, but only insofar as the weight and stress factors were concerned. Who cared what gauge of material was used so long as it was strong enough and light enough to meet the necessary requirements?

However, in the years ahead, as each competitive manufacturer readied his new plane for the air, it became more and more apparent that a few standard gauges and types of material would have to be agreed upon by all aircraft manufacturers concerned if the rolling mills were to be able to supply an adequate amount of types and gauges for immediate use at all times.

The fact that the warehouses are now stocking standard gauges, types and sizes of aluminum sheet, bar and tubing which are recognized and used by 99% of the manufacturers in the aircraft industry is proof that the problem of materials, as far as the airframe is concerned, has been solved to the satisfaction of all.

This lesson learned the hard way should have been a criterion for the advent of jet propulsion with its heat resisting and super alloys, but, lo and behold, as the jet program accelerates we find ourselves in the same old hassle. Due to the newness of the program, each individual manufacturer has set about procuring materials in gauges and sizes which (in his opinion) will best fit his own particular needs.

Jet hodge-podge

This hodge-podge method of ordering soon left the rolling mills faced with the task of selecting one of two alternatives: (1) They could cater to the whims of each manufacturer, thus resulting in a poor delivery schedule and higher cost per pound, or (2) they could set up their own standard gauges and depend on the tolerances allowed to bring them within the range of gauges required by the customer.

Since the latter was the more logical course to follow, it now became possible for the customer who, for instance, ordered .043 gauge material, to receive a partial shipment of .040 gauge and a partial shipment of .046 gauge, all within the mill tolerance of the .043 gauge which he has ordered, thus causing great difficulty in properly forming a part on a tool or die which had been built for .043 material.

The National Aircraft Standards Committee, recognizing the seriousness of this situation, has published a list of standard gauges for all metal sheet, with the thought in mind that sooner or later a sadder but wiser aircraft metals industry would awake to the realization that they have again missed the ball.

I say, let's not wait for "Old Man Experience" in order to learn the same old lesson all over again. Let each one

of us get his own house in order and beat the old man to the punch.

In 1928 the world was rocked by the news that a non-stop flight from New York to Paris had been successfully completed in 33 hours. It was unbelievable! Yet in 1953 the news that a plane had flown non-stop from Santa Monica to Paris in 21½ hours seemed of small concern to anyone except the parties involved.

Do we who are responsible for the procurement and distribution of the materials to be used in the next phase of this country's wonderful progress in aviation wish to be the bottleneck?

Think it over.

WATER TREATMENT

. . . *Continued from page 39*

increase the chemical requirement for neutralization.

The lime requirement is determined by the pH of the reacted solution. Lime is added in the required proportion to produce a clarified effluent with a pH of 8.0. If the pH were allowed to fall into the acid range, it would damage the pumping equipment and the piping system. On the other hand, if the solution were allowed to reach high alkalinity, an encrustation in valves and piping would occur. A recording pH meter will soon be installed to provide a means for continuous pH control. At the current pumping rate of 2,400 gal. per min., the system consumes about 2,150 lb. of lime per day.

The mixing period in the first two contactors is 23 minutes at design flow which is sufficient to raise the solution pH from approximately 3.0 to approximately 8.5. The reaction, which carries over into the third contactor, results in the precipitation of calcium fluoride and some coagulation of finely divided particulates.

It is estimated that the neutralization of hydrofluoric acid is about 85% complete by the time the flow leaves the third neutralizing tank. Due to the necessity of intensive mixing in the three contactors to accomplish a high degree of neutralization, much of the particulate present is in a finely divided state having low settling rates.

To complete neutralization and to accomplish coagulation and precipitation of fine particulates, the liquid is subjected to a secondary mixing period of approximately 30 minutes with a coagulating agent in the center well of the reactor-clarifier. The coagulant addition is made to the liquid before it enters the reactor compartment, where it is gently circulated with a high capacity mixer in such a

manner as to promote the formation of floc with improved settling characteristics.

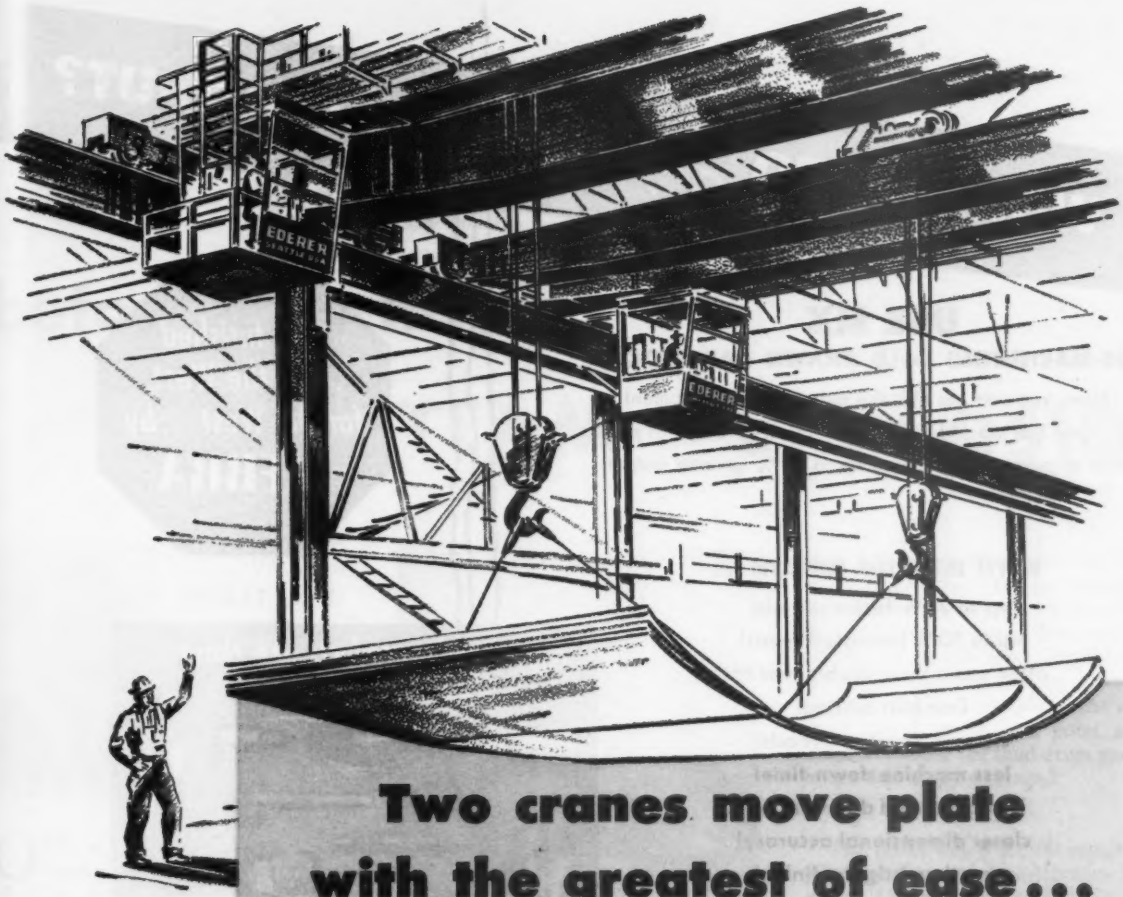
The coagulant is made up of a 5% solution of ferric sulfate and added according to the turbidity of the clarifier effluent. In order to produce an effluent of less than 10 ppm. suspensoids, the system consumes about 25 ppm. of coagulant. As the operation of the water treatment plant gradually increases to a flow of 6,400 gal. per min. it may become necessary to install a continuous turbidity recorder as a coagulant control device.

The flocculated liquid passes from the reactor compartment into the clarification zone, where particulates settle to the bottom as sludge and the clear liquid spills over a serrated weir plate into a peripheral trough. The sludge is slowly raked into a thickening chamber at the center of the clarifier, where it is pumped to the sludge beds or is recirculated to the first contactor to provide additional seeding and to reduce chemical consumption. This operation is controlled by an automatic hydraulic valve which is positioned by an adjustable electric timing device that permits intermittent pumping at a rate of 90 gal. per min.

Effluent from the reactor clarifier is clear, containing less than 10 ppm. of suspended solids and less than 20 ppm. of calcium fluorides in solution. The clear solution is returned to a sump below the floor of the pump house through a continuous recording flow nozzle. Fresh water make-up in the sump is controlled by a float valve on the plant water system. With a 3 to 5% make-up there is no objectionable build-up of soluble solids in the recirculation system.

The pump house serves as the control room for the water treatment plant. It houses three large recirculating pumps and the necessary switches and controls for all pieces of operating machinery. The flow recorder, air blower and coagulant mixing equipment are also housed in this building. The three recirculating pumps have a capacity of 3,000 gal. per min. each and are regulated to discharge into the scrubber recirculation main at a gauge pressure of 60 psi. This provides a gauge pressure of about 50 psi. at the scrubbers.

The solids now stored in piles after evaporating the liquids from the sludge wastes offer a potential economic recovery, as they consist chiefly of calcium chloride, excess lime, carbon materials and lesser amounts of coagulant reaction products and reduction pot bath materials.



Two cranes move plate with the greatest of ease...

In the plant where these two 10-ton, 70-foot-span cranes are operating, there is frequent need for the "tandem" operation of both cranes in handling large size steel plate. At other times the two cranes operate independently. To fit the specific requirements of this operation, EDERER "job-engineered" the pair of cranes with synchronized speeds for the dual operation.

This designing and building cranes to the exact materials handling requirements of industry has made EDERER cranes perform with extra efficiency and economy. EDERER—one of the largest crane manufacturers in the West—can "job-engineer" a crane to your requirements.

Write for Crane Bulletin CR-500

240C53

EDERER

CRANES

EDERER ENGINEERING COMPANY • 2935 First Avenue South • Seattle 4, Wash.

Export Division: 301 Clay Street, San Francisco 11, Calif.

OVER 50 YEARS "JOB-ENGINEERING" CRANES FOR INDUSTRY

WANT UP TO 54% GREATER OUTPUT?

USE MX

FREE-MACHINING COLD DRAWN BAR STOCK!

Now, you can get MX, the marvelous development in cold drawn bar stock that definitely lowers the cost of production of parts . . . by giving up to 54% greater output.

Cold finished
. . . in the West,
for the West . . . by
SIERRA

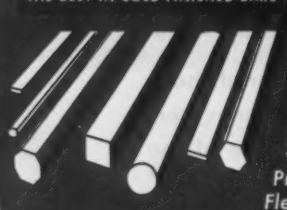
WITH MX YOU OBTAIN . . .

up to 33% faster speeds!
up to 50% increased feeds!
often more than double tool life!
less burr milling!
cleaner, sharper threads!
less machine down-time!
improved cold deformation!
closer dimensional accuracy!
smoother, brighter finish!

If you make products like these . . .
you should use MX

Only Independently Owned
Cold Finishing Bar Mills in the West . . .

OFFERING YOU . . .
THE BEST IN COLD FINISHED BARS



with
Complete Metallurgical Service
Complete Engineering Service
Production Flexibility
Fast Delivery

OUTPUT AND EFFICIENCY RISE . . . COSTS DROP!

MX is rolled by United States Steel . . . cold finished for you by Sierra.

Give MX a thorough-going test on your own equipment. See for yourself how this amazing bar stock can increase your output and efficiency . . . reduce your costs.

MX supplements the regular Sierra line of cold drawn bars of B-1113 and similar steels. Available in all bar shapes.

Why not up your production too? Start NOW!

Wire . . . Phone . . . or Write, TODAY!

SIERRA DRAWN STEEL CORPORATION

5821 East Randolph Street • Los Angeles • UNderhill 0-3101

. . . of the Northwest

1917 Shaffer Street • Box 65, Boeing Field • Seattle • RAinier 5961

Quality and Service for Western Industry

Better check BOILER CORROSION before you have A STEAM EXPLOSION

By
WILLIAM R. CARTER
Assistant Superintendent Engineering Department Pacific Indemnity Company Los Angeles

ONE of the greatest causes of explosions or severe overheating of steam boilers is low water. Since operators often place too much dependence on automatic controls, a great many accidents can be traced directly to sheer carelessness.

I recall one incident in a plant where there were three large Stirling boilers. The feedwater regulator on the middle boiler leaked, and as a consequence the boiler would fill up with water during the night.

Regulator off at night

The engineer developed the habit of shutting off the regulator each night at the end of the shift, and had done this for several weeks. One morning he came to work and lit off the burners about 6:30 a. m. to raise steam for plant operation at 8 a. m.

On this particular morning he forgot to open the feedwater regulator and at 9 a. m., could not figure out why the steam flow on this boiler was dropping off. He accordingly stepped up the gas flow to the burners, and since it was his custom to always blow-down at 9 a. m., he went around to the back of the boiler and opened the blow-offs just as six tubes suddenly pulled out of the front steam drum with a terrific roar. When investigation was made, it was found the water level had dropped to a point about three feet above the mud drum and the boiler was badly damaged.

TOP: Low water was the trouble—boiler traveled 500 ft. from its foundations.

CENTER: Locomotive-type boiler—26,000-lb. boiler traveled 350 ft. from foundation.

BOTTOM: Another case of low water—where a boiler once stood.

Results

The result was a $7,500 repair bill, plus curtailment of production for a week. The engineer had placed too much dependence on the feedwater regulator, which no doubt led to his neglecting to check the water level in the gauge glass.

There is an increasing tendency for operators to rely entirely on automatic controls, and it should be borne in mind that any control depends on the maintenance it receives for proper functioning.

Take a boiler equipped with a feedwater regulator, a low-water cutout or alarm and pressure regulator. The operator gets so accustomed to these devices maintaining proper pressure and water level, etc., that he neglects them.

One day the feedwater regulator fails to function and the low-water cutout or alarm cannot operate because the float chamber is full of mud, due to failure to use the drain daily. Needless to say, we either have an explosion or a badly burned boiler.

Frequent testing

Controls should be tested at regular and frequent intervals to insure that they are in proper operating order. Low-water cutouts or alarms should be tested daily and if equipped with float chambers, these should be drained or blown-down daily to keep them free of deposits. The water column should

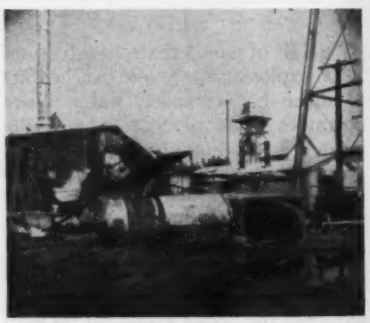
be blown-down at least twice each shift and the return of the water in the glass observed. Very slow return indicates a possible restriction in the water line which may be caused by scale.

When boilers are in operation, they should not be left unattended for long periods of time and certainly not longer than the time it takes for the water to drop to the bottom of the glass when the feed is shut off while steaming.

Famous last words: "There was water in the glass only a few minutes ago."

Speaking of explosion, how many people are aware of the terrific energy stored up in a boiler? A 150-hp. horizontal return boiler, 72 in. in diameter by 18 ft. long, contains approximately 15,660 lb. of water when carried at the normal steaming level. If a pressure of 200 psi. is carried and the shell plate is suddenly ruptured and exposes the water to atmospheric pressure, a force of roughly 908,200,000 ft. lb. is released. A good motto is "WATCH THAT WATER LEVEL."

Boilers should be kept clean of scale, mud or oil deposits, and no matter how carefully a feedwater treatment and



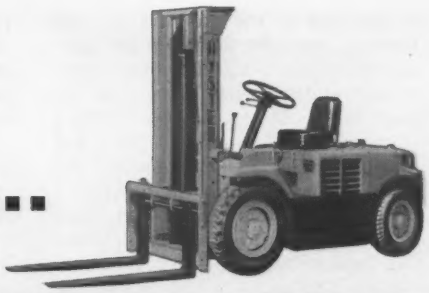
BOTH BOILER and boiler house were demolished in this instance. Water tower is at right.

control is used, they should be opened at regular intervals and washed out. These intervals will of course vary, depending on service encountered and feedwater.

On locomotive-type boilers, the crown sheet and water legs should be kept clean. On vertical tubular boilers, scale dropping off the tubes will lodge on the lower tube sheet between the tubes and cause leakage at the tube ends. Collapsed furnaces occur frequently in the Scotch marine type and although most are caused by low water, a great many are caused by scale or oil deposits.

Scale or oil deposits in tubes of water tube boilers cause bulges, blisters, and ruptures. Since the drums are usually protected, or not directly

To all basic HYSTER TRUCKS...

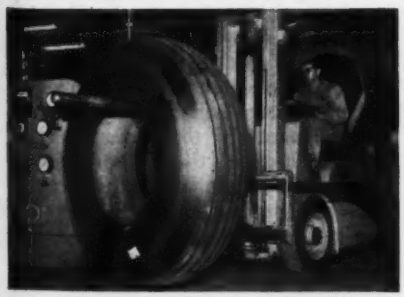


Paper-roll Load-Grab

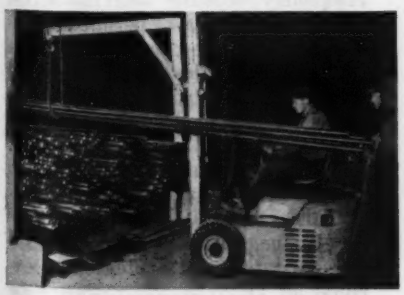
Karry Krane with Boom Extension

4-Barrel Load-Grab

Scoop—for loose aggregates.



Ram—for tires, rolls, spools, etc.



Boom—for odd shapes, light crane work.

you can add... HYSTER attachments

and do scores of jobs quicker...at less cost!

Are your materials hard-to-handle? The right Hyster® Truck Attachment — and Hyster offers more than 100 of them — frequently is the *key* to greater profits.

Whether your product is in the form of bales, boxes, bricks, barrels, buckets, aggregates, rolls or cylinders, your Hyster Lift Truck and the right attachment is the most effective answer to the problem of moving materials which cannot be handled with pallets.

Your Hyster Dealer is a specialist in reducing materials handling costs. He can recommend the correct lift truck practices for *your* materials.

Make the Hyster Lift Truck your *basic* materials handling tool—to it add the right cost-reducing attachments. Call your Hyster Dealer today, or write for Catalogs 1266, 1219, 1258 to:

HYSTER COMPANY
5301 Pacific Blvd.
Huntington Park, Calif.
LOgan 3291

HYSTER COMPANY
4445 3rd Street
San Francisco 24, Calif.
Mission 8-0680

HYSTER SALES COMPANY
2105 S. E. 7th Ave.
Portland 8, Oregon
Filmore 6471

HYSTER COMPANY
753 9th Ave. North
Seattle 9, Wash.
ELiott 2401

Be Sure to Call HYSTER Before You Buy ANY Lift Truck!

FOUR FACTORIES: • *Portland, Oregon; Danville, Illinois; Peoria, Illinois; Nijmegen, The Netherlands*

in the path of the products of combustion, generally the tubes are damaged first due to a dirty boiler. Horizontal return tubular boilers are the most susceptible to damage resulting from scale or oil deposits, as the lower portion of the boiler is directly exposed to combustion in the furnace.

A very important place to keep clean is the stayplate at the rear head, where the bottom through-stays are connected. This plate is fastened to the rear head with thimbles or spacers, with a space of roughly three in. between it and the rear head, to allow attachment of the through-stays and provide a space for water. It is common for boiler inspectors to find this area plugged solid with scale and the rear head badly burned, necessitating the application of a patch.

Too often, when this type of boiler is washed out, a hose is used from the front manhole and loose scale is actually washed up behind this plate, where it bakes into a solid mass. Unless the boiler is too small to enter, the only way to clean it properly is to get into it, or use the chemical de-scaling service now furnished by several reliable companies specializing in this service.

Corrosion in boilers on the internal surfaces is usually caused by improper feedwater treatment or no treatment at all when in service. The pH value of water in a boiler should be kept between 10.5 to 11.5, and feedwater should never be less than 7.

Where condensate is returned to the boiler, care should be taken to prevent air from entering the system. Free oxygen resulting will cause severe pitting, as will other dissolved gases. A regular schedule of water testing and treatment should be adhered to and the blowing down of boilers should be correlated with this treatment in order to maintain boiler water at correct concentration.

External corrosion occurs when boilers are idle and not properly prepared for a lay-up. Soot and other products of combustion should be removed, since they will gather moisture and cause corrosion. In the locomotive type, it usually occurs in the lower corners of the firebox beneath the protective firebrick. These areas, as well as the edge of the mud ring, are often found to be seriously corroded. Corrosion is quite frequent in the smokebox end, where soot collects at the bottom.

Rain caps required

Vertical tubular boilers should have a rain cap that can be lowered over the top of the stack to prevent rainwater entering when idle, and the smoke hood should have an opening provided for inspection and cleaning of the top tube sheet. The drum heads or headers of water tube boilers should be installed so soot and other products of combustion can be easily cleaned out. Many instances have occurred where it was necessary to replace a head or heads because they were seriously thinned by external corrosion caused by soot deposits that gathered moisture when the boiler was idle for long periods of time.

When a boiler is idle for an extended period of time, it should be drained completely of water and the access openings left open to permit circulation of air. If the openings are to be closed, pans of lime should be placed in the drums to absorb moisture. Soot should be cleaned off the external surfaces. Care should be taken to see that all steam and water valves are tight to prevent leakage into the boiler.

If the wet method is used, the boiler should be filled completely with treated water and care taken to exclude all air. The water should be tested at frequent intervals to ensure the pH value is kept high enough. The only advantage of the wet method is being able to place the boiler in service

in a short period of time should it be required.

When starting up or taking boilers off the line, care should be taken to start up slowly and not to cool them off too fast. If this is not done, it is certain to cause leaks at tube ends or riveted seams, and in some cases has caused cracking of the front head below the furnace in Scotch marine boilers.

On the line procedure

When putting boilers on the line, care should be taken to have the pressure on the incoming boiler slightly higher than the header pressure. The drain for piping between the two header valves should be open to get rid of any accumulated water. The valve next to the boiler should be opened slowly, followed by the second valve to prevent possibility of shock due to water hammer and sudden change of temperatures.

The same procedure should be followed when opening blow-off valves. Many operators believe the only purpose of a blow-off is to remove loose scale or mud deposits, but its true function is to control the concentration in the boiler water. While one quick opening valve may be used, together with a slow-opening one, as permitted by the ASME Code, we prefer the use of two slow-opening valves. This prevents severe shock, which may result in bursting the valve body or pipe and burning the operator.

Boilers should not be overloaded. While they can carry loads in excess of their nominal rating, there are very definite limits. When these are exceeded, fuel goes up the stack, maintenance costs go sky-rocketing and the expected useful life of the boiler is greatly shortened.

Air tanks should be drained daily of accumulated water, and should the water show signs of rust, an internal inspection should be made at once to determine if corrosion is present. If large quantities of oil are noted, the air compressor supplying the tank should be checked for leaky piston rings. Many serious explosions have occurred when excessive oil in a tank became ignited and resulted in internal combustion.

Ignition is usually caused by high discharge temperatures at the compressor, caused by leaky discharge valves and the resultant re-cycling of air. It should be borne in mind that when internal combustion occurs in an air tank, the safety valve or valves cannot possibly relieve the tremendous increase in pressure.

While it is not the intent of this

Continued on page 72

CAN YOU GET ALONG WITHOUT GAS?

If you burn more than 25,000 cu. ft. per hr., you must have adequate standby facilities

LARGE FLUCTUATIONS in the volume of natural gas consumption have made it necessary to develop a system for maintaining optimum flow throughout the year.

In order to keep the cost of gas to the user at a minimum, it has been necessary to operate the long and expensive transmission lines which supply virtually all our natural gas, at a very high load factor.

The transmission line that supplies the West Coast with gas extends 956 mi. to the great Permian Basin in Western Texas. Cost of this transmission system has been approximately $150,000,000. Consequently, amortization, depreciation, interest charges and maintenance expenses constitute a large part of the cost of gas to the consumer.

Extent to which the cost may be expected to vary with the load factor may be seen in Figure 1. High load factor of lines supplying gas to California is possible through a combination of equability of climate, diversity of winter peak loads and the existence of certain industries which consume large quantities of gas in the warm summer months. These factors all tend to smooth out the yearly demand curve.

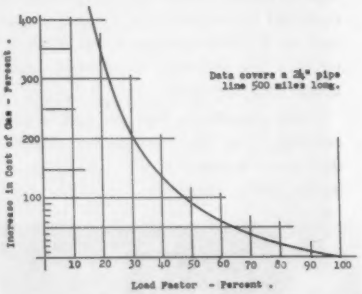


FIGURE 1: Graph shows effect of load factor on cost of gas transmission. Data comes from "Problems of Long Distance Transportation of Natural Gas," Federal Power Commission staff report, docket G-580, 1947.

Greatest single factor creating fluctuations in demand for gas is weather. Comfort heating, water heating and industrial processing all require more fuel in cold weather than in warm weather. Normal load will increase in California, in the coldest winter period, by about 350% over the peak demand of the summer season.

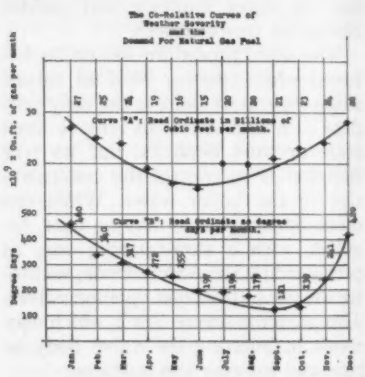


FIGURE 2: Chart shows the effect of weather upon demand for gas. CURVE "A": Cubic ft. delivered per month, in round figures, through transmission lines of Pacific Gas and Electric Co. for the year 1952. CURVE "B": Weather curve for San Francisco—a representative curve. Monthly degree day averages for 48 years.

Variation in weather severity, with consequent variation in fuel demand, is measured in degree days. Average daily temperature below 65 deg. F. is a measure of the amount of heat required, indicating the number of degree days for any one day. Figure 2 shows variation in weather for the city of San Francisco in degree days.

Also shown is the amount of gas delivered in the territory of the Pacific Gas and Electric Co. for each month during 1952. This curve duplicates the weather chart in form quite closely.

It can be seen that the demand for gas is not constant and cannot be made so. Yet it is economically important that transmission lines operate at all times at maximum capacity. The demand curve must be as flat as possible, with peaks and valleys being eliminated. Measures must be adopted to

. . . which MPB ball bearing do you need?

new MPB catalog 53-54,

Most complete information ever offered on miniature ball bearings

includes:

- **Complete specifications and descriptions of more than 140 different types and sizes of miniature ball bearings**
- **Bearings from 1/10" to 3/8" o.d. shown in actual sizes**
- **Speed-load charts with factor for easy conversion to any desired speed or load**
- **Lubrication — what and how — including government specifications and commercial sources**
- **Recommended shaft and housing fits; shaft and shoulder data**
- **Radial and axial clearance graphs**
- **Typical methods of using miniature ball bearings**

For the designer of precision mechanisms this new 20 page **MPB** catalog offers practical solutions of problems involving miniaturization. As suggested by the partial list of contents above, **MPB,** originator and pioneer manufacturer of miniature ball bearings, has compiled for you the most complete and detailed information ever offered on this subject.

Request the new **MPB** catalog 53-54 on your letterhead . . . it may help develop a new product idea for you. Also request data sheet WI 10.

HOW DO THEY MAKE MINIATURE PRECISION BEARINGS?
If you've ever wondered about it — you'll find the answer in "MIGHTY MINIATURES" — 15 minute, full-color, sound film. "MM" is the story of Miniature Precision Bearings — with the accent on manufacturing processes and uses of MPB bearings. It's available to qualified groups. Write Engineering Dept., MPB, Inc., Keene, N. H.

GET YOUR BEARINGS AT . . . **Miniature Precision Bearings**

Incorporated Keene, New Hampshire

prevent shortage of fuel when demand exceeds pipeline capacity. This is done in two ways.

"Peak loads may be shaved" or "loads may be dumped." Peak shaving requires supplying additional gas at or near the point of consumption for distribution through the utility's local distribution network. Long transmission lines act very satisfactorily as holders. During periods of low demand the pressure is built up in the entire line, which acts as a great reservoir storing gas for later release. This stored gas is known as "line pack." Gas is also stored in large holders such as those operated by P. G. & E. at San Francisco and Richmond. Each holds 17,000,000 cu. ft. of gas.

Sub-surface storage

Large underground storage reservoirs may be used to store gas during slack seasons. These usually consist of old gas or oil fields from which fuels have been removed.

The second method of peak control, load dumping, consists of flow stoppage to specified customers. These customers receive gas at a preferred price and are on interruptible schedules, as distinguished from firm schedules under which gas delivery is not subject to stoppage. Those using gas under the interruptible schedules are subject to shut-off at a moment's notice by the gas dispatcher, and are required by the utility to provide adequate standby facilities for use during periods of shortage.

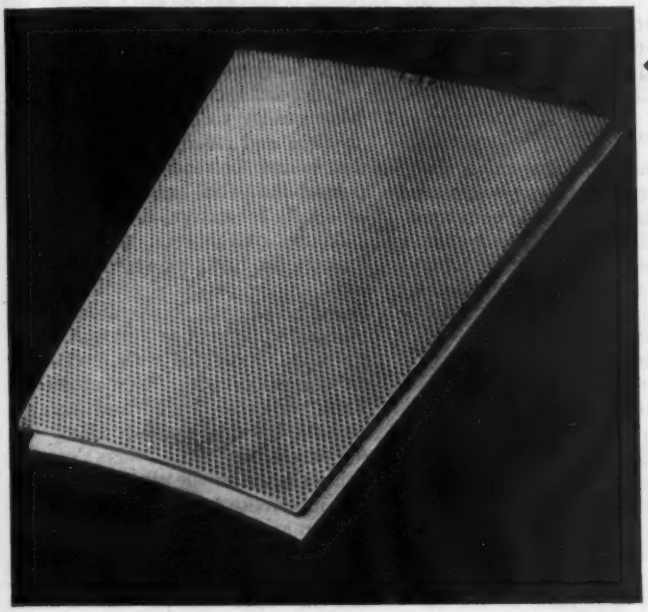
Interruptible users have been divided into groups of approximately equal load. When the amount of curtailment has been calculated, the gas control department instructs individual users to discontinue use of gas immediately and refrain from using it until notified. Inspectors are sent to see that shut-off has actually been made. In ordering the curtailment, every effort is made to rotate the shut-off so that all groups are treated equally.

Utilities supplying natural gas on the Pacific Coast attempt to equalize the difference between pipeline capacity and peak demands mainly through load dumping. Control was effected by limiting maximum loads which may be served on the firm rates. The burden of providing substitute fuel during periods of curtailment is transferred from the supplier to the user. In the winter of 1948-1949 some users had to provide substitute fuel for as long as a month. In the past few years, however, winters have been considerably milder and most users have been cut off very little if at all.

Interruptible users can pay off their

Now They Are Mass Produced

by HAYNES Investment Casting
Trade-Mark



IMPROVED DESIGN AND MATERIAL—The tiny needle-sharp points covering this plate must resist severe abrasion. Machined points used to wear out frequently because they were pyramidal in shape and highly susceptible to erosion. HAYNES investment casting made it possible to cast the points in a more stable conical shape from a hard, wear-resistant alloy. Life has been increased by 5 to 12 times.

EXCELLENT SURFACE QUALITY—For sanitary reasons, not even the smallest crevice can be tolerated on this cream separator part. Because of the high quality of HAYNES investment castings, it was found that the intricate part could be manufactured on a production basis with a minimum of imperfections showing up during the final polishing operations. This eliminated a great deal of wasted time, work, and metal.

NO MORE MACHINING—HAYNES investment casting eliminated the job of machining these rollers. Service conditions require that the rollers be made of a special alloy which is difficult to machine. They must resist rusting and the cutting action of wire passing over them under tension. The rollers give excellent service life and there are no more machining problems.

HAYNES investment castings can solve some of your own production and design problems. For more information, contact the nearest Haynes Stellite Company office listed below.

"Haynes" is a registered trade-mark of Union Carbide and Carbon Corporation.

HAYNES INVESTMENT CASTINGS
Trade-Mark

Sound, dense, high-strength parts available in cobalt-base alloys, nickel-base alloys, iron-base alloys, stainless steels, and alloy and carbon steels.

Haynes Stellite Company
A Division of
Union Carbide and Carbon Corporation
UCC
General Offices and Works, Kokomo, Indiana
Sales Offices
Chicago — Cleveland — Detroit — Houston
Los Angeles—New York—San Francisco—Tulsa

standby facilities through a reduced gas rate. P. G. & E. sells its 1,050 Btu. gas to users on an interruptible basis at 32¢ per thousand cubic feet. Users on a firm basis, on the other hand, pay 45¢-50¢ per thousand cubic feet.

"Adequate standby facilities" refers to equipment capable of immediately replacing gas burner equipment, and fuel storage of adequate capacity to last through any curtailment period. Exact amount of storage is modified by the frequency and ease with which deliveries of the substitute fuel can be expected.

Adapting fuel

Any fuel may be adapted to this program by using twin burner systems —one for natural gas and the second for the substitute fuel. In some cases, the combination burner is used where light oils substitute for natural gas. A third alternative is the substitution of manufactured gas for natural gas.

Manufactured gas is particularly desirable where a great variety of gas-burning apparatus or equipment exists, since there is generally very little need for change or adjustment of equipment. In some processes the raw vapors of liquefied hydrocarbon gases, propane, butanes or mixtures may be used directly in burner equipment. Adjustment of proportional mixtures may be varied to provide for the difference in heating value and specific gravity between natural gas and the vapors. Size of orifices and air valves may be changed to accomplish the same purpose.

Where much equipment specifically designed for natural gas is to be served, installation of a gas-air machine is indicated desirable. In this case, a small isolated plant manufactures gas of the same heating value as natural gas and approximately the same specific gravity. When curtailment is imposed, it is only necessary to valve the standby plant into the house lines, and no change or adjustment is required in the burner equipment.

Gas manufactured by such a plant is so similar to natural gas in both physical and chemical characteristics that it may be readily substituted in critical industrial processes designed especially for natural gas fuel.

Many combination gas and oil burners for firing all types of equipment can be procured at the present time. Some are conventional gas-burning equipment or atmospheric inspirators, integrated with mechanical oil burners or with steam atomizers. These vaporize the oil and inject it into the burning chamber along with the necessary air. Others pre-mix either the gas or the oil in an air blast and inject the mixture into the combustion area. Still others vaporize the light oil at or near the burner tips, at comparatively high temperatures and mix the vapor with pre-heated air to provide the proper fuel mixture. The latter burner is a dual fuel burner, burning either oil vapor or natural gas.

APPRENTICE-CATCHER

Small leaflet gets big results

A HIGHLY SUCCESSFUL means for getting apprentices has been found by Boeing Airplane Company of Seattle in the form of an inauspicious-looking little leaflet, a four-page black-and-white job measuring 5½ x 8½ in. which contains the necessary facts for high-school students on apprenticeship training at Boeing. Since it has been in use, the list of apprentices has increased from 14 to 106 despite the fact that the company's standards of apprentice selection have been raised.

It was prepared by the Boeing Training Unit with three uses in mind: distribution at high school vocational conferences, reference material for school administrators and counselors, and reference material for apprentice applicants and their parents.

Distribution has been made primarily through the cooperation of the office of the public schools employment supervisor and the Washington State Employment Service, which have been instrumental in getting the brochure into all high schools, public and parochial, within a 50-mile radius of Seattle.

Three trades

The leaflet brings out the idea that applications are being accepted for apprenticeships in three trades; aircraft and engine mechanic, machinist and tool and die maker. The first two call for four years of training, while

SO SIMPLE

NO PINS • NO PIVOTS • NO BEARINGS

No Wonder There's No Trouble

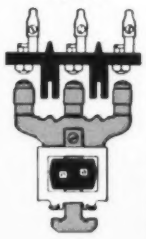
In any device it's the moving parts that are the troublemakers. The more moving parts . . . the more chances for trouble.

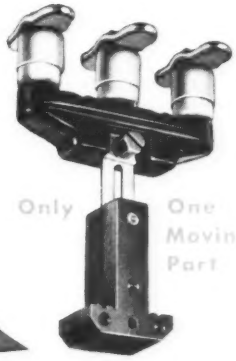
Most motor starters have lots of moving parts like pins, pivots, bearings, and linkages. But . . . Allen-Bradley Bulletin 709 solenoid starters and contactors have ONLY ONE MOVING PART . . . the solenoid plunger which carries the movable contacts. No switch could be simpler . . . nor more trouble free. The silver alloy contacts need no filing or dressing. They are always in good operating condition.

The Bulletin 709 general purpose enclosures, shown below, have a bonderized, black enamel exterior finish that is corrosion resistant. The white interiors make installation and inspection easy in dark places. All switch parts have a "quality" finish. In fact, you cannot buy better "quality looking" control.

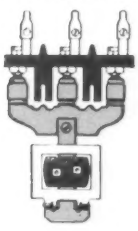
Special enclosures are available for every kind of service condition. These across-the-line starters can also be furnished in "open type," without enclosures, for mounting in machine base. Let us send you our catalog!

CONTACTOR OPEN





CONTACTOR CLOSED



Send for Illustrated Bulletin

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.

COMPLETE LINE

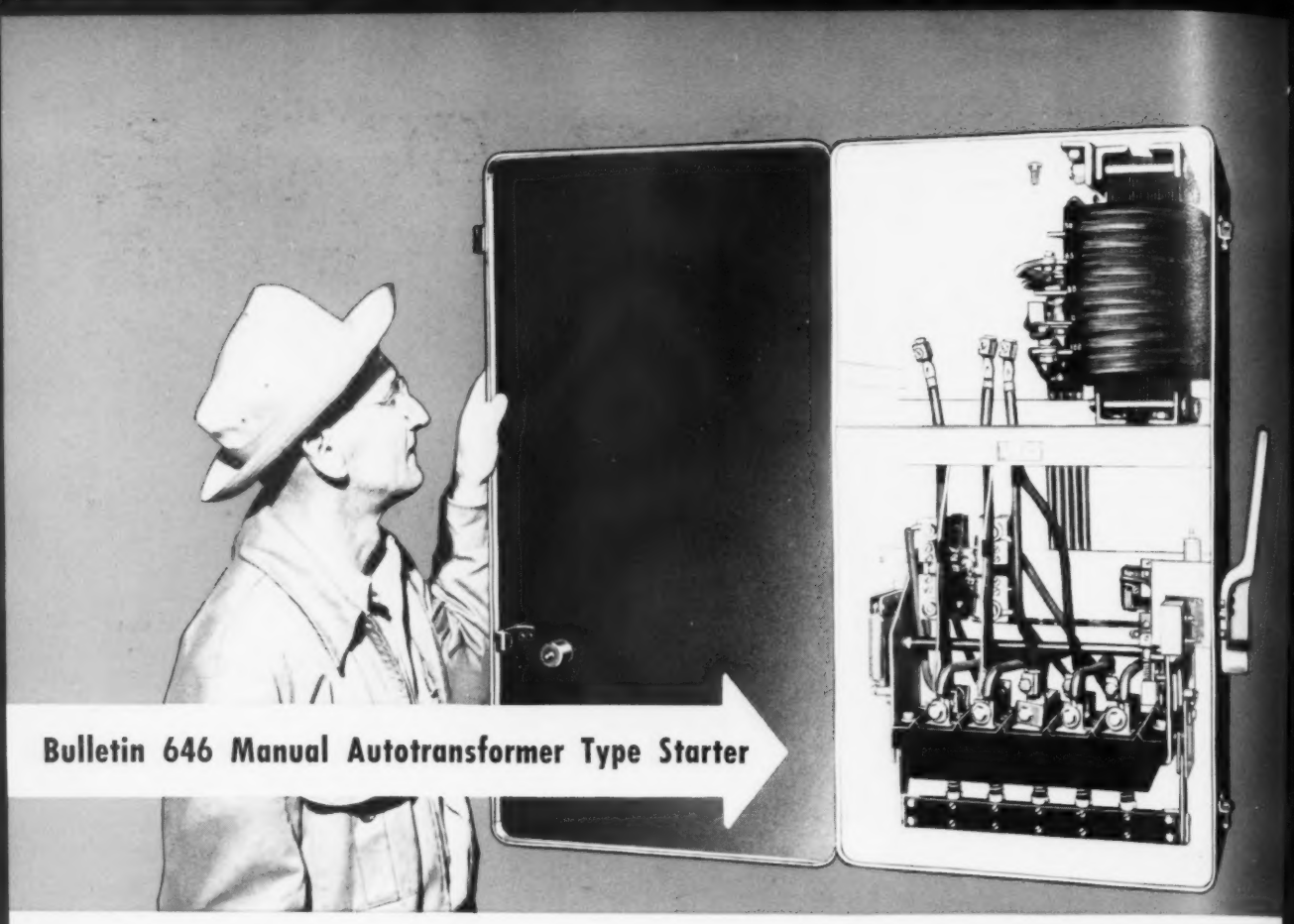
Allen-Bradley Bulletin 709 Across-the-line Starters are listed for 3-phase motors up to 600 hp, 440-550 v. All starters have accurate relays for overload protection.

ALLEN-BRADLEY

QUALITY

TROUBLE FREE MOTOR CONTROLS

7-53-MR



LOOK! Air Break Contacts for Motors up to 150 hp, 440-550 v

When you buy a manually operated autotransformer starter, don't overlook these advantages of the Allen-Bradley Bulletin 646 Starter:

In addition to time-delay switchover and dependable overload relays, the Bulletin 646 Starter is listed with *air break contacts* for ratings up to 75 hp, 220 v; 150 hp, 440-550 v. Oil is messy and should be used only where atmospheric conditions require it. These starters can be furnished with oil-immersed contacts, if desired.

Allen-Bradley double break, silver alloy contacts need no cleaning, filing, or dressing. This saves labor and lengthens contact life. Starting voltage taps are easily adjusted to suit starting conditions. Time delay undervoltage release is optional.

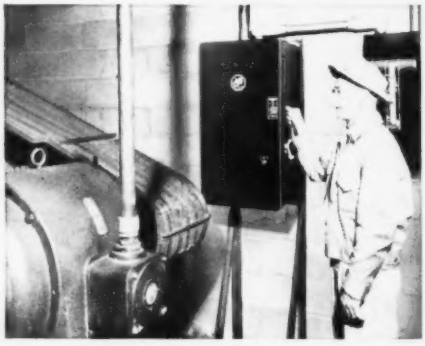
Bulletin 646 autotransformer type starters are available in NEMA Type 1, Type 4, and Type 9 enclosures. For full details write for Bulletin 646, a 12-page booklet with dimensions and ratings up to 250 hp, 440-550 volts.

Allen-Bradley Co. 1316 S. Second St., Milwaukee 4, Wis.

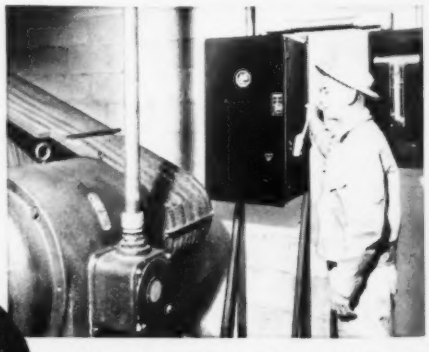
ALLEN-BRADLEY

QUALITY

TROUBLE FREE MOTOR CONTROLS



To start motor, operating lever is pulled into START position. Built-in automatic time delay prevents operator from immediately throwing lever to RUN position.



After motor accelerates, the time-delay trips. Operator can then . . . but not before . . . push lever into RUN position. If operator shifts too soon, operating lever must be returned to START.

7-53-M

the tool and die maker category, listed as a "limited opportunity," is for five years.

The applicant must be 18 years of age or over, or 17 years with minor permit. He must be a high school graduate or equivalent, with preference given those who have majored in mathematics, science or industrial arts. A letter of recommendation from a designated school authority also is required, covering the applicant's participation in school activities, character reference and citizenship ratings.

Training for the aircraft and engine mechanic apprentice, the message discloses, calls for instruction and experience in all branches of the trade. The apprentice develops into a practical and skilled all-around airplane mechanic as he trains under a succession of 70 or more supervisors in 20 shops and on the flight apron. His work experience and training includes mechanical drawing, shop mathematics, layout, welding, riveting, forming of aircraft metals and assembly of parts of the airplane.

Job consists of . . .

Making and installing electrical, tubing and cable controls is part of the job, as is work on power packs, propellers and jets, their installation and testing. In preflight operation he learns to prepare the ship for inspection and for flight and to handle the ship on the ground. He is required to pass the Civil Aeronautics Administration's examination for aircraft and engine licenses.

"The apprentice machinist," the leaflet says, "learns to set up and operate all the machines that are normally used in a complete modern machine shop. Under direct supervision he does production work on power saws, drill presses, lathes, mills, grind-

ers, shapers, planers and specially designed machines for the airplane industry.

"Both on machine operation and bench work, the machinist works to exact tolerances from drawings and models. He uses a wide variety of precision hand tools and calibrated measuring instruments. Advanced shop mathematics, including geometry and trigonometry, and interpretation of blueprints used in production of machined parts are reviewed in related training classes.

"Heat treating, inspection and assembly of machined parts are required of all machinists. Further, they must have a broad knowledge of the properties of all metals commonly used in the industry."

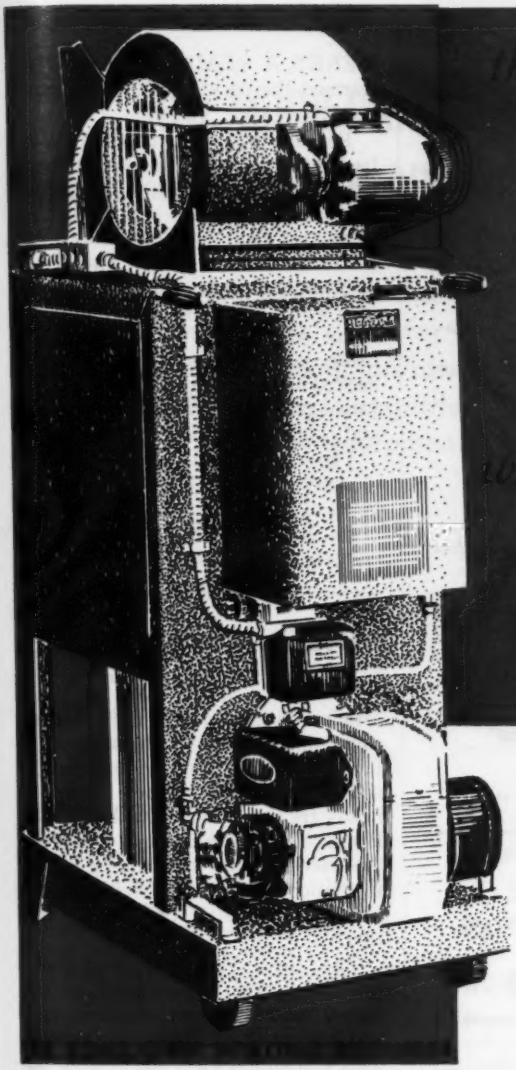
For the tool and die maker apprentice, the training will teach him to make tools, patterns and jigs that the production worker uses to produce parts and assemblies. He learns to set up and operate all the machines used in the machine shop, and also to operate duplicating and other special tool and die machines.

He becomes an expert with hand tools as well as machines, and he spends much of his time doing bench work to exact tolerances and fits. He learns to lay out all types of tools and dies from prints and sketches, and he learns the application of geometry and trigonometry. He is able to work from engineering drawings and is frequently called upon to do some drawing himself while making specially designed tools. He needs a broad knowledge of the properties and limitations of metals in order to produce the tools and dies required to manufacture production parts.

Works under supervision

The apprentice works under the supervision of top-grade mechanics and foremen. Apprentice wages are determined by the labor contract on a percentage basis of the journeyman's rate. The current wage scale for apprentices starts at $1.08 per hour and is increased approximately 12 cents every six months until the apprenticeship is completed.

"Apprenticeship for some boys is comparable to a college education," the leaflet concludes. "For the bright, serious-minded young man it offers security and the opportunity to develop into a position of leadership and responsibility. The demand for trained aircraft mechanics, machinists, and tool and die makers exceeds the supply by a wide margin. Present world-wide conditions indicate still greater demands for the future."



The Mortemp Heat Machine may be used vented or unvented — it requires no chimney or flue. It may be moved from work zone to work zone to put heat where you want it, when you want it. Mortemp delivers heat at the floor level where it is not wasted.

the Mortemp Method

will save 75% of your heating dollar

25% — *A portable heating unit* which can be moved from work zone to work zone.

25% — A unit employing the patented "counter-flo" three-way *floor level heat delivery*, heating the working area, not the ceiling area.

25% — A unit giving 99+% *combustion* with no loss of heat up the chimney.

PROVEN IN INDUSTRY

Aside from heating men at work, Mortemp effectively and inexpensively ventilates welding areas, maintains constant temperatures in semi-enclosed buildings, puts immediate heat in any desired working zone. Mortemp's portability and floor-level heat delivery have been the answer to thousands of industrial heating problems.

Mortemp's patented "counter-flo" three-way heat delivery heats the working area–*not* the ceiling area.

DISTRIBUTORS

ALASKA
Piston Service
Anchorage

IDAHO
Southern Idaho Equip. Co.
Idaho Falls
Spencer Supply
Boise

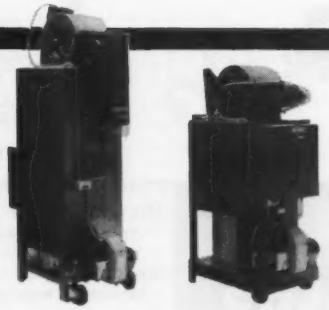
OREGON
Carroll Equipment Co.
Pendleton
Cascade Equipment Co.
Eugene
Industrial Machinery & Supply
LaGrande
Lorenz Company
Medford
Salem Steel and Supply
Salem

UTAH
The Galigher Company
Salt Lake City

WASHINGTON
American Auto Parts
Seattle
Andrews Equip. Service
Spokane
E. T. Pybus Company
Wenatchee
Rankin Equipment
Yakima
Star Machinery
Seattle

WYOMING
Wilson Equip. & Supply
Cheyenne

(Mortemp distributorships available)



MODEL "H"

MODEL "L"

MORTEMP SPECIFICATIONS

The Mortemp Heat Machine is available in two models — "L" and "H". Both machines burn standard stove oil and operate from any 110 volt circuit. They need only be plugged in for *immediate* use. The output of each machine is 189,000 B.T.U.s. Both machines may be used unvented, however, the Model "H" may be vented where it is desired. Both Mortemp machines may also be easily converted to summer cooling.

See your nearest distributor or write

MORTEMP HEAT MACHINE CO.

2310 Rainier Avenue Seattle 44, Washington

OUR READING PUBLIC

HERE'S A READER response that warmed the cockles of our collective heart.

Recently we picked up from the in-basket a new Coppus Engineering Corp. catalog (No. 180) on portable ventilators and found clipped to it an "Engineer Teaser" published by *Western Industry* in July 1952. The "Teaser" was the situation of a California firm which was restricted from doing repair welding within a building because of hydrogen gas fumes and needed help in finding equipment that would pass through narrow aisleways and could be handled by one man.

The sender—and reader with a long memory—Roy A. Woltman, Los Angeles, of King-Knight Company, engineers and mechanical and electrical equipment distributors.

BOILER MAINTENANCE

. . . Continued from page 81

article to discuss design and construction, tanks equipped with substandard heads, such as disc and bull heads, should be avoided. These types of heads are not equipped with skirts or flanges for attachment to the shell. The stress on the weld will be purely in tension although the weld actually forms the radius of the knuckle section.

The "breathing" of the head under pressure fluctuations produces an improper bending stress in the weld itself and progressive cracking develops. This cracking always starts from the inside, where it cannot be detected, and progresses to the point where failure occurs and a serious explosion results. To be on the safe side, always specify that vessels must be built in accordance with the ASME Code and so stamped.

Some operators feel that boiler inspectors are merely a necessary nuisance, but nothing could be farther from the truth. These men must have an extensive background of experience in the operation or construction of boilers and pressure vessels. They are required to serve a probationary period of training before they can take the qualifying examination, and are specialists in their line.

They are expert in detecting defects that otherwise might go unnoticed and result in disastrous explosions. There is no doubt that serious accidents are averted each year due to their diligence and knowledge of where to look for trouble in the many different types of boilers now in common use.

HOW MUCH CAN YOU PROFIT WITH AMERICAN BLOWER AIR HANDLING PRODUCTS?

For clearcut evidence that Gyrol Fluid Drives offer tangible savings . . . for low-cost methods to lick chemical processing problems . . . for a timely and practical heating suggestion — read how American Blower equipment can serve you.

MORE BUSHELS

Recently, a manufacturer bought several of our type TM Gyrol Fluid Drive units for use on his oil seed presses. Then, he kept close records on the performance of each press for almost a year. Reports show that with the Gyrol Fluid Drives, *the daily capacity of each press was boosted from 1300 to 1650 bushels!* For the advantages of smooth power transmission, shock absorption and overload protection on your machines, call your nearest American Blower Branch Office.

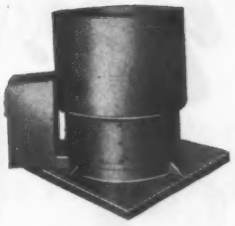
BETTER PROCESSING

Why not call on American Blower to help with the air handling assignments in your chemical process work? We've had plenty of firsthand experience. Major chemical producers use American Blower fans and blowers (both standard and special types) in processing chlorine, elemental phosphorus, sulphuric acid, bleach and caustic. Our branch office personnel can often save you time with on-the-spot suggestions.

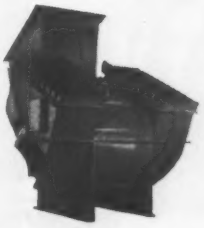
NOW IS THE TIME...

Plan now for winter heating. If your present heating system is inadequate or inefficient, replace or supplement it with American Blower Unit Heaters. These efficient Unit Heaters distribute heat evenly over a wide area, assure comfortable final temperatures everywhere. In many installations, American Blower Unit Heaters have paid for themselves in fuel savings alone within two to three years! Models for steam or hot water heating systems, also self-contained, gas-fired models.

Whether your needs are civilian or military, American Blower heating, cooling, drying, air conditioning and air handling equipment contributes toward improving over-all comfort and efficiency. For data, phone or write our nearest branch office.

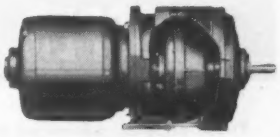


Roof Ventilators

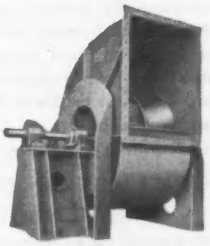


Mechanical Draft Fans

Dust Collectors



Gyrol Fluid Drives



Industrial Fans

AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN
WEST COAST PLANT: SAN LEANDRO, CALIFORNIA

Division of AMERICAN RADIATOR & Standard Sanitary CORPORATION

YOUR BEST BUY **AMERICAN BLOWER** **AIR HANDLING EQUIPMENT**

Serving home and industry: AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS

ANNUAL CONVENTION of California Mfrs. Assn.

CALIFORNIA Manufacturers Association annual meeting will be held this year at the Hotel Statler, Los Angeles, Oct. 22. Instead of dividing up part of the session into separate panels as in the past, the entire affair will consist of a general session in the morning, and another in the afternoon.

The program at the time of going to press was as follows:

Morning

"Why a Uniform National Manufacturers Sales Tax?" Fred Maytag, president, Maytag Co., Newton, Iowa, and chairman of NAM's taxation committee. A recognized national authority on sales and excise taxes.

"Financing California's State Government," T. H. Mugford, chief, Calif. Division of Budgets and Accounts. Sen. Ben Hulse, chairman, Senate Finance Committee.

Luncheon

"The Budget and Fiscal Problems of Your Government." Joseph M. Dodge, Director of the Federal Budget.

Afternoon

"World Trade and Problems of the Pacific," to be presented by a nationally known authority on the subject.

"Adequate Fuel Supply Essential to California's Industrial Development." Paul Kayser, president, El Paso Natural Gas Co. Mr. Kayser's company is presently supplying half of the natural gas consumed in California—a behind-the-scenes report.

Evening

Reception and cocktail party. An opportunity to meet Senator Knowland and the board of directors of CMA.

Banquet. "A Report on the Far East." Sen. Wm. Knowland, majority leader of the Senate.

TRAFFIC CONFERENCE

A THREE-DAY traffic conference was held in Salt Lake City in September, under the sponsorship of the Fourth Transportation Zone, U. S. Army, with transportation personnel representing carriers and U. S. Army transportation officers of the eleven Western States participating. Registration was approximately 430, and various phases of transportation and traffic problems were discussed by a number of military and civilian speakers.

THE Amerigear* FULLY CROWNED TOOTH DESIGN

*Trade Mark Reg.

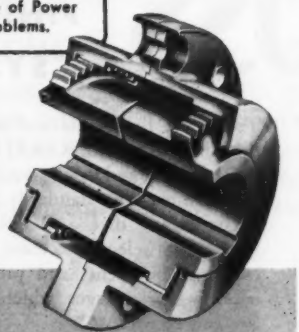
Solves Long-Standing Power Transmission Problems

This fundamental improvement in gear tooth design practically eliminates all "end tooth and tip" contact and provides greater freedom of axial movement. These and other exclusive advantages of Amerigear Couplings distinguish them from common gear-type couplings. There are numerous instances where the fully crowned tooth design of Amerigear Couplings has been utilized to simplify power transmission mechanisms and add reliability to performance in a measure heretofore considered impossible.

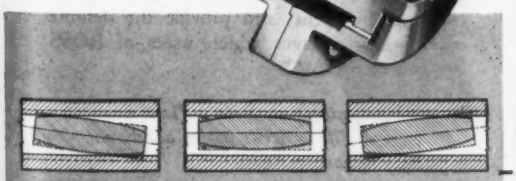
Amerigear Couplings offer many more advantages than are obtainable with common basic designs. If your problem arises from excessive offset or angular misalignment, tight backlash requirement, space limitations, high speeds and loads, or any combination of these, it can be solved by the use of Amerigear Couplings. Amerigear Engineers are available for consultation.

Amerigear*

Fully Crowned Tooth Design Solves Wide Range of Power Transmission Problems.



Oil Seals of Amerigear Couplings Are As Advanced in Design, Performance, and Effectiveness As Is the Amerigear Fully Crowned Tooth.



Comparison of Amerigear Fully Crowned Tooth Design With Gearing of Conventional Gear-Type Couplings Shows How "End Tooth and Tip" Contact Is Practically Eliminated and Why Greater Freedom of Axial Movement Is Provided by Amerigear Fully Crowned Tooth Design (dotted lines indicate gear teeth of conventional gear-type coupling.)

AMERICAN FLEXIBLE COUPLING COMPANY

Originator of the Amerigear Fully Crowned Tooth
Sales Offices in Principal Industrial Centers

ERIE, PA., U. S. A. — AFFILIATE J. A. ZURN MFG. CO.

Exclusive Pacific Coast Sales Agent **ZURN WESTERN SERVICES, INC.**
1048 Folsom Street, San Francisco 3, California

American Flexible Coupling Co., Erie, Pa., U. S. A.
Please send me further information regarding AMERIGEAR COUPLINGS with the Fully Crowned Teeth and Catalog No. 501.

Name ..... *Title* .....
Company .....
Address .....
City ..... *State* .....
Please attach to your business letterhead.

PUNCH CAPACITY

Examples for selecting correct press for a given job

By
STANLEY M. SWIATEK
President, Diamond Machine Tool Co.
Pico (Los Angeles)

THE DESIGN of the component parts of a punch press includes many computations confusing to the average user. The following examples are to help you in the selection of the correct press for a given job.

First in importance is a knowledge of the tensile strength of the material. For annealed tool steel this may be considered at approximately 50 tons (of 2,000 lb.) per sq. in.; for mild steel, 25 tons; for bronze, 20 tons; and for tin 2½ tons. (Data pertaining to materials not listed may be found in sheet metal workers handbook.)

Assuming, then, that the job is to punch a one-inch hole in mild steel sheet ⅛ in. thick, multiply the circumference of the hole (3.14) x the thickness of the material (.125), or 3.14 x .125 x 25 = 9.8 tons. This job, therefore, could safely be done on a press with a mimimum rated capacity of ten tons.

This formula is for blanking dies without shear. When it is possible to apply shear to either the punch or the die, the crushing pressure required will decrease in direct proportion to the amount of shear used.

Considering the fact that cutting tools are often allowed to get dull, a safe general rule in providing a press for doing certain shearing or punching work is to have it capable of safely exerting and resisting a force powerful enough to tear apart one square inch which is required to be sheared, although with sharp dies the shearing is usually a little less than the tensile strength.

To give an example of the principle above stated, suppose a press user wishes to shear off bars of iron 1 in. square, or bars 2 x ½ in. or 4 x ¼ in. or to punch a hole 1 in. in diameter (which is about 3 in. around) in iron ⅓ in. thick, or 2 in. in diameter in a sheet 1/6 in. thick, or 12 in. diameter in a sheet 1/36 in. thick. In any of these cases he will want to cut an actual section of about 1 in. square. He will, therefore, need to use a machine which will give 25-tons pressure at the beginning of the cutting operation or more accurately speaking, a little after its beginning, after some slight crushing of the metal.

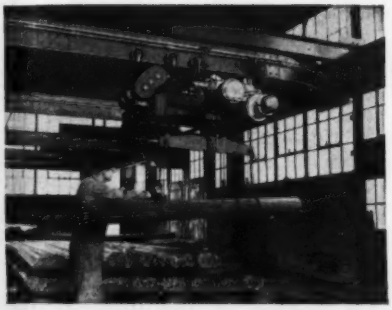
This initial pressure, for instance in cutting off 1 in. square, will not have to be maintained during the whole 1 in. of ram descent while the cutting is going on. This is because the resistance will soon begin to decrease, say after the first ⅜ in. to ½ in. of descent, ceasing entirely after about ¾ in. of motion.

Bar disintegrates

At this time the bar will have been so disintegrated as to fall apart before being pushed entirely down to the amount of its own thickness.

A common shop method for determining the capacity of an unknown press is to square the diameter of the crankshaft at the main bearings and multiply by 3½. Thus, a press with a crankshaft 2 in. in diameter would apply a pressure of 2 x 2 = 4 x 3½ or 14 tons.

MONORAIL *Pays!*

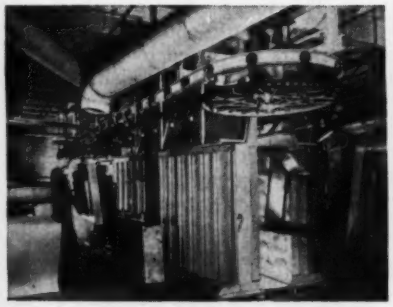


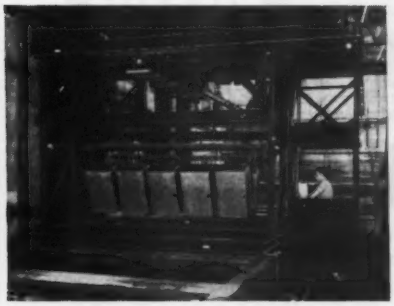
INCREASES TONNAGE

From 26 to 48 tons of steel rod per day was the increased movement produced by a properly engineered monorail system.

LOWERS COST

This simple system actually saved $150 in handling costs within four months of operation. No more sheet-by-sheet movement.





SAVES TIME

Passage, on monorail, of metal parts through infra-red dryer, cuts 70% from former drying time. All other handling in plant on monorail.

MORE CAPACITY

30% more capacity was added to metal cleaning process by handling a third more units on carrier with one man operation from cab control.

LESS LABOR

Operators claim to save 26 man hours per truck over former unloading time. Interlocking monorail cranes in the plant also reduce handling costs.

Write for Bulletin C-1
showing many more cases where MONORAIL PAYS!

THE AMERICAN MONORAIL COMPANY

13117 ATHENS AVENUE — **CLEVELAND 7, OHIO**

Los Angeles, Calif.
American Monorail Co.
4645 Anaheim Telegraph Road

Seattle, Wash.
F. T. Crowe Co.
325 Second Ave.

San Francisco, Calif.
Robert M. Taylor Co.
268 Market St.

Portland, Oregon
John S. McMahon
1318 S.W. Alder Street

10 IS MORE THAN 75

Next decade must beat last three-fourths century

MANUFACTURERS of electrical apparatus and appliances will be called upon to produce more in the next ten years than they have in the past 75 years, according to Ralph J. Cordiner, president of General Electric Co., which on Oct. 15 observes its 75th anniversary.

Coming from the head of the world's largest electrical manufacturing firm, which was a pioneer in development of Western hydroelectric power, Western industry might well give the statement some thought.

Indicative of the growth of power development in the West is the installation of enough turbines in California and Arizona alone, since the end of World War II, by GE, to produce more than 3,000,000 kw.—equal to the combined generating capacity of Hoover and Grand Coulee dams.

This record is a far cry back to the days of 1893, when GE transmission line work was born in the West with the opening of the Redlands-Mill Creek power line in Southern California. This was the first polyphase system in the world and the three-phase generators developed by GE marked the beginning of the present form of power transmission.

Another first in which General Electric Co. participated in a big way, was the "long distance" transmission line from the old Folsom Dam on the American River to Sacramento, Calif., in 1895.

GE gambled on the success of hydroelectric power by providing $200,000 worth of equipment and taking Folsom Power and Water Co. bonds at 50 cents on the dollar in payment. This power plant delivered 11,000 volts to Sacramento so successfully that the gamble paid off in two years when the bonds reached par.

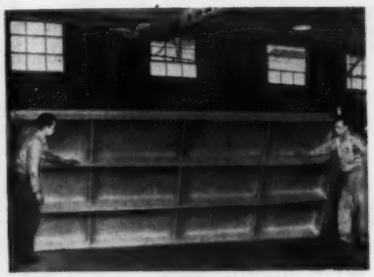
Today General Electric Co. has ten plants in the West employing 15,000 persons manufacturing electrical products from flat irons to transformers and motors. In the state of Washington it is producing plutonium for the government.

GE operates in California: world's largest—and the company's only—plant for production of electric irons which was established at Ontario in 1904; the only incandescent lamp factory west of the Rockies in Oakland which started early this century, as well as the largest self-contained transformer plant in the West and motor control and wire cable plants;

the only GE plant for production of single phase, integral horsepower motors at San Jose; a jet engine service center at Los Angeles.

Other GE facilities are at Anaheim, Calif., for manufacture of chemicals; and the Trumbull department plants in North Hollywood, San Francisco, Calif., and Seattle, Wash., where panel and switchboard circuit breakers are made.

MONSTER CASTINGS made from aluminum



PIONEER TOOL ENGINEERING, Inc., recently built an aluminum casting for Consolidated Vultee Aircraft Corp. larger than any ever poured in a single piece in any plant on the West Coast.

No moulds were available to pour a casting of the size needed so a special job was required. The El Segundo engineers solved the problem by making a sand core mould especially for the job.

Weighing 6,500 lb., the odd sized casting measures 6 x 15 ft. Standard sizes of aluminum tooling plates cast at the plant are 49 x 96 in., 48 x 120 in., and 48 x 144 in. Special sizes up to 65 x 216 in. can be furnished on order.

Pioneer applied their formula 92IT to the sand core. This material is approximately 66⅔% lighter than steel. With high tensile strength for compression needs, its fine grain structure is made more homogeneous by the addition of titanium.

NEW NOZZLE for air turbine

AN AIR turbine motor of variable area nozzle is being produced by AiResearch Mfg. Co., of Los Angeles. The ATM-50 drives hydraulic pumps and constant speed DC generators or alternators that formerly were driven by main engines in the aircraft. The function of the nozzle is to automatically adjust turbine torque to power requirements. This greatly reduced the air consumption on this type of throttling control.

FILMS AND FILM STRIPS

High-precision manufacturing

Utica Drop Forge & Tool Corp. has a new 16 mm. sound film which shows the manufacturing process of jet aircraft blades. Among the operations pictured in the 17-minute film are sinking of forging dies, precision forging, machining and final inspection of a wide variety of blades. The movie was produced in cooperation between Carborundum Co. and Utica Drop Forge and taken in Utica's plants at Yorkville, Whitestown and Clayville, New York. Prints are available, for cost of postage on film, to schools and public or community groups by writing Henry Zellweger, Utica Drop Forge & Tool Corporation, Utica 4, New York.

* * *

Electronic computers

New 16 mm. color-sound motion picture, 22 minutes long, is available without charge from International Business Machines Corp. Film traces development of computing devices up through IBM's latest "giant brain," particularly the progress since 1946, when electronic circuits were first used for computing and control. Present application of IBM's commercial electronic calculators in business and industry is shown. Film, titled "Piercing the Unknown," may be booked through any IBM branch office or through Department of Education, International Business Machines Corp., Endicott, N. Y.

* * *

Installing baseboard

New full-color sound movie shows every step in the installation of baseboard in a home, starring the journeyman-steamfitter who does the work. Progress of the job is shown through the completed and furnished room. Film is useful for contractors, architects and designers because of the range of problems illustrated—from attaching studs, joining and treating corners to placement of floor coverings under the baseboard. The 15-minute film has been released by The Trane Co., manufacturers of air conditioning, heating and ventilating equipment, and is available free, through Trane jobbers, to contractors. Educational institutions and industry associations may also secure the film without charge by writing The Trane Co., LaCrosse, Wisc.

* * *

Welding stainless steel

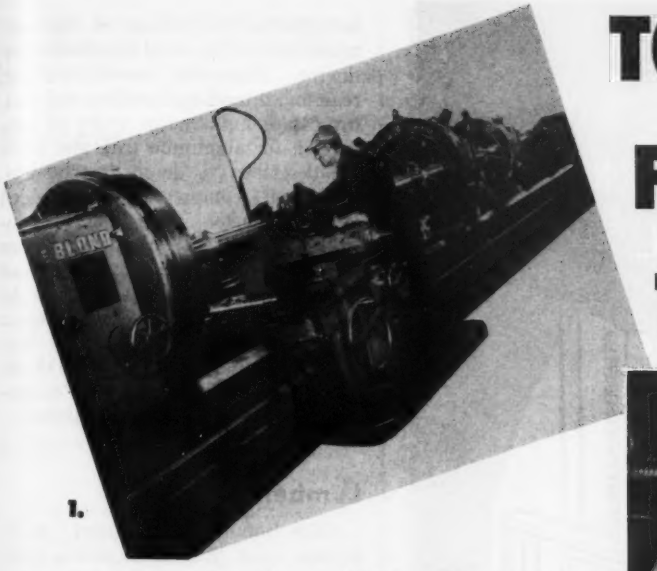
"Resistance Welding of Stainless Steel" is the title of a new 16 mm. color-sound film which shows spot, seam, projection and butt welding of stainless steel. Drawings supplement photographed material in the 22-minute movie. Film is available on free loan from Allegheny Ludlum Steel Corp., 2020 Oliver Building, Pittsburgh 22, Pa.

* * *

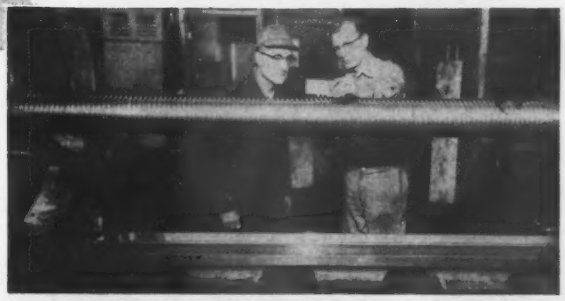
Electrical wiring with aluminum

Originally prepared for electricians working on the new Alcoa office building in Pittsburgh, this film explains and demonstrates techniques of handling and joining aluminum conduit, cable and wire. It also is useful as an

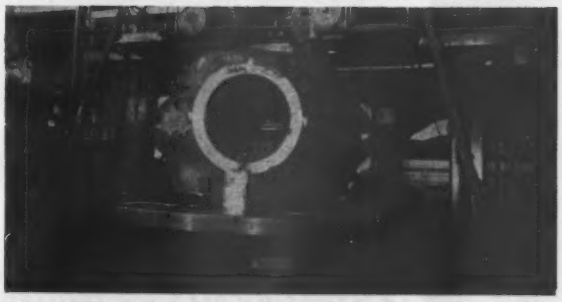
TOOLED FOR THE TOUGHER JOBS



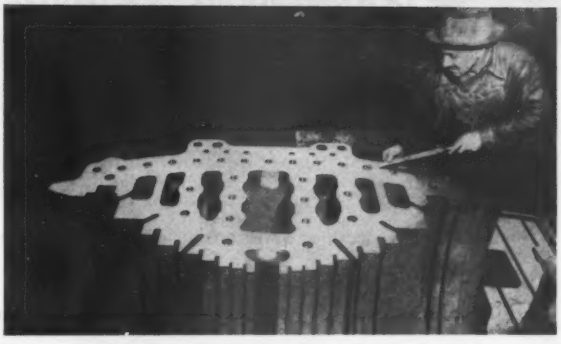
1.



2.



3.



4.

For Nearly 50 Years

MOORE MACHINE TOOLS
SKILLED OPERATORS
"KNOW HOW" have
solved the West's toughest machining jobs

1. Machining 22′ 6″ of ¾″ pitch, 1½″ lead, 1 in 8 slope right hand double threads in forged steel screw shaft for the steel industry. Lathe swings 50″ by 39′ between centers.

2. Close up of screw detail. Checking double thread contour with thread gauge.

3. Turning blade ring grooves in turbine casing on vertical boring and turning mill. Maximum swing of this tool is 18′ 3″, vertical clearance 10′ 6″.

4. Scraping mating surface on half section of turbine casing. Finished diameter of ring grooves varies from 4′ 6″ to 6′ 6″. Tolerances held as close to .002″ on diameter.

IMMEDIATE REPAIR WORK
ACCURATE PRODUCTION WORK

MOORE
DRY DOCK COMPANY

THE COMPLETE INDUSTRIAL PLANT

Let Moore Modern Machine Tools —Techniques— Skill answer your Machining Problem... Large or small.

MOORE DRYDOCK COMPANY
FOOT *of* ADELINE ST., OAKLAND 23, CALIF.

MACHINING • GRINDING • FORGING • HEAT TREATING • PLATE • SHEET • PIPE FABRICATION • STRUCTURAL STEEL FABRICATION AND ERECTION

introduction for persons in the electrical field to the use of aluminum conductor. Discussion covers cutting, reaming, threading, handling and pulling cable. Four major types of connection for aluminum wire and cable are described in detail: mechanical, loop joint, compression and welded joints. A pocket-size booklet, also entitled "Electrical Wiring with Alcoa Aluminum," is made available to all persons viewing film. Film may be requested from Alcoa sales offices or from Motion Picture division, Aluminum Company of America, 818 Alcoa Building, Pittsburgh 19, Pa., giving estimate of potential audience.

* * *

Lumber industry

"The Bounty of the Forest," a 28-minute color film, is available from Western Pine Association for use by industry and civic groups. Movie was photographed in 1952 on a number of locations in the Western pine region and describes logging operations, manufacture of wood products, and step-by-step use of wood in building a home. Film also identifies many of the West's trees and their uses, and pictures the Western Pine Association research laboratory in Portland, Ore. Requests for the film, which is loaned without charge, should be addressed to the Western Pine Association, Yeon Building, Portland 4, Ore. Black and white prints for television showing are also available.

* * *

Welding economies

Color strip film with sound accompaniment illustrates, through photographs and diagrams, actual case histories of unusual savings resulting from proper welding techniques. Titled "Better, Faster, Cheaper with Welding," the 19-minute strip film is available without charge from Technical Information Service, Department "P," Eutectic Welding Alloys Corp., 172nd Street and Northern Blvd., Flushing 58, N. Y.

* * *

Manufacturing brass

New 16 mm. color-sound film, which runs 29 minutes, "The Science of Making Brass," introduces the layman to brass production, from the casting shop to final distribution of products. Scenes were photographed in Waterbury, Conn., and Cleveland, Ohio, mills of Chase Brass & Copper Co., subsidiary of Kennecott Copper Corp. Animation is used to explain details of casting, extrusion, drawing and rolling processes. Film may be

requested from Chase warehouses and sales offices or Chase Executive Offices, Waterbury 20, Conn.

* * *

Film catalogs

National Safety Council's National Directory of Safety Films lists 963 motion pictures and slide films on occupational accident prevention and home and office safety. All known agencies in field of safety, as well as some in first aid, fire prevention and civil defense, are included. Supplements will be published quarterly. Directory may be purchased for 75 cents from National Safety Council, 425 N. Michigan Ave., Chicago 11.

* * *

New catalog of 34 business and industrial films issued by Pacific Central Region, National Association of Manufacturers, San Francisco, is designed for use by Western television film editors. Films listed include those released by the following companies: General Motors Corp., Pacific Intermountain Express, J. A. Folger & Co., California & Hawaiian Sugar Refining Corp., Standard Oil Co. of Calif., Union Ice Co., Food Machinery & Chemical Corp., Cutter Laboratories, Western Pine Assn., Wright & McGill Co., Colorado Fuel & Iron Corp.

* * *

The 1953 film catalog of Ford Motor Co. describes 25 16-mm. movies available without charge to organized groups, including two new ones, "Anniversary" and "The American Road." Fifteen of the movies are in color. Running times are from 7 to 45 minutes. Free catalogs may be obtained from Ford Motor Co., 1500 South 26th St., Richmond, Calif.

* * *

The following reports on research into instructional films are available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C., for price shown.

Instructional Film Research (Rapid Mass Learning) 1918-1950, October 1951, 185 pages, $2.50. Code No. of report: PB 111000.

Comparison of Mental Practice and Physical Practice in the Learning of Physical Skills, June 1952, 11 pages, 50¢. Code No. PB 111094.

Effects of a Stereoscopic Sound Motion Picture on the Learning of a Perceptual-Motor-Task, September 1952, 13 pages, 50¢. Code No. PB 111143.

The Effect of a Pre-Film Test on Learning from an Educational Sound Motion Picture, November 1952, 15 pages, 25¢. PB 111172.

NUCLEAR WEATHERVANE
What kind of plants we will have

THREE BROAD PHASES in the growth of industrial utilization of nuclear power were pictured by Geo. L. Weil, consultant, Washington, D. C., at the 1951 Conference on Nuclear Energy at the University of California, Berkeley, in September.

In the first phase there would be plants that utilize natural or slightly enriched uranium as feed and inventory. The basic types of plants would include:

(1) Pressurized light water-cooled and moderated-slightly enriched uranium fuel.

(2) Pressurized heavy water-cooled and moderated-natural uranium fuel.

(3) Pressurized helium-cooled-graphite moderated-natural or slightly enriched uranium.

(4) Sodium-cooled-graphite moderated-slightly enriched uranium fuel.

These would be what he called the poor non-breeders. During this phase their performance characteristics would be gradually improved to the practical and economic limit of natural or low enrichment reactors. Perhaps some of the starters would drop out along the line.

The second phase, in his opinion, would include good non-breeders and poor breeders. Both would use highly enriched fissionable material as inventory, as well as fertile material. The early models of non-breeders would require some fissionable material feed, at most not more than a small, say 5%, of total feed requirements. The later models would most probably require only the most fertile of material.

In this phase the availability of fissionable material at a cost which will not make inventory charges economically prohibitive would be a prerequisite to the practical feasibility of the plants. Thus, in addition to the requirement for a feed utilization at least close to 100%, special emphasis will be placed on high specific powers, kilowatts per kilogram, in order to minimize fissionable material inventory requirements. The poor breeders of this phase are defined as not having a sufficiently large excess material production capacity to significantly contribute to the inventory requirements of new plants.

The third phase would see plants with large breeding factors and high specific powers combining to give relatively short inventory doubling times. In this phase nuclear power plants would begin to assume a substantial fraction of our annual requirements for expansion of energy production.

GAS ABSORPTION
Activated bauxite saves corrosion

A RESEARCH project at the Denver Research Institute of the University of Denver has developed a new technique using activated bauxite for the removal from natural gas of acids and water which corrode pipes.

Dr. Thomas D. Nevens, associate research engineer in the Institute's chemical division, said extensive experimentation has resulted in construction and successful operation of two new full-scale absorption plants using activated bauxite.

Research was conducted at the Institute for the Stearns-Roger Manufacturing Co. of Denver.

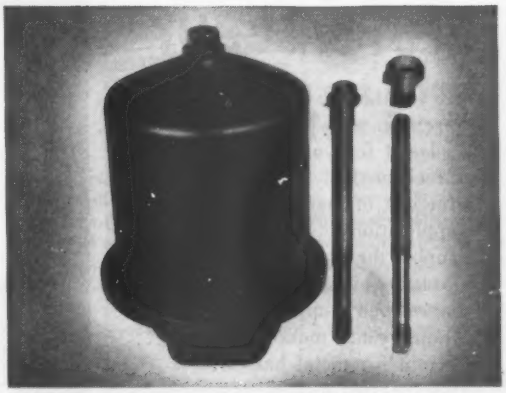
Here's where Purolator screened out rising costs

• Purolator makes oil filters for a prominent auto maker. They're top-notch filters that do a tough job well. Purolator and the car manufacturer are both proud of them.

Not long ago an RB&W "fastener engineer" got loose in the Purolator plant—just when company production executives were looking for a way to lick rising costs. He noticed that the Purolator filter was being assembled with a two-piece fastener made slowly and laboriously on a screw machine.

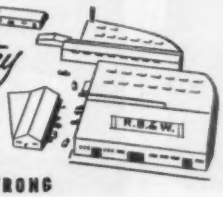
Our man told the Purolator people about RB&W's batteries of cold-forming machines. Purolator wanted to know more. Now their filter is assembled with a one-piece RB&W fastener that costs far less to make and assemble.

Chances are you can find a stage in your operations where RB&W "fastener engineering" can help you keep costs in line. As a leading manufacturer of all kinds of fasteners, we're always able to recommend and supply the right ones for all your needs. Write RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY, Port Chester, N. Y.



EASIER, FASTER ASSEMBLY undercut high costs when Purolator switched from a two-piece fastener *(right)* to an RB&W-designed cold-formed fastener *(left)* for its famous oil filter.

RB&W *serves Western industry with the complete quality line*



WEST COAST PLANT: 4466 Warth St., Los Angeles, Calif. Other plants: Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill. Additional sales offices: San Francisco, Dallas, Chicago, Detroit, Pittsburgh, Philadelphia. Sales agents: Portland, Seattle. Distributors from coast to coast.

100 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

HEATING CABLE SETS aid oil flow

THE CALIFORNIA COMPANY at Red Wash, Utah, has installed heating cable sets around the pipe lines at its brand new oil field. This step was taken to keep the oil at a temperature that permits its flow through these lines.

The oil is pumped from approximately 5,000 ft. down in the earth and stored in field tanks. Surplus gas from the field is used to heat the oil in these tanks to approximately 100 deg. F. This is necessary because the oil will not flow at less than 90 deg. F. due to high paraffin content in the oil. The problem was to keep the temperature of the oil sufficiently high to send it through approximately seven miles of field pipeline. It is then injected into the truck pipe line to be mixed with other crude oils for shipment to refineries.

Lead-covered heating cables were attached to the pipe line to keep the oil at proper temperature. Each heating cable set is 437 ft. in length with 20-ft. Geoprene Versatol non-heating leads permanently molded to the cable. The sets were precoated with an asphalt base and mounted five at a time, on a special pay-off rig. Thus, the five cables could be applied simultaneously to the line. As the cable was run along the line, operators applied a 3/16-in. coating of asphalt enamel followed by a glass cloth wrap to hold them in place. A second application of asphalt was put over the glass wrap, and at each control point the bulb of the thermostatic control was laid in direct contact with the pipe line under the glass cloth wrap. The thermostat bulb was then wrapped with an aluminum-foil insulating material and covered with a watertight compound.

Power line poles were installed every 435 ft. for the power connections to the heating cables. Automatic thermostat controls were located at alternate poles.

QUIVERING QUIZ Computer catches carrier's vibrations

BOEING Airplane Company's electronic analog computer was used recently to work out a vibration problem in the reconditioning of an escort-type

aircraft carrier at the Puget Sound Naval Shipyard at Bremerton, Wash.

Two electric generators had been replaced with a single higher-capacity generator, but when started the new unit was found to have vibrations, severe enough when the ship was docked, but even more objectionable when the carrier put to sea and increasingly so when the ship accelerated.

Engineers at the shipyard came up with several structural-change ideas, one of which called for altering the dimensions and rigidities of the existing structure supporting the generator and then observing the effects. Instead of actually cutting into the ship's steel, however, the situation was simulated on a Boeing computer, and 16 modifications were tried out in five hours without touching a torch to the floor plates. One was found to reduce the vibration by 47% and was selected as the answer.

WESTERN INDUSTRY Picks a winner

GEORGE Vernon Russell, Los Angeles architect, has been honored with an award of merit for his design used in construction of the Republic Supply Co. plant and office at San Leandro, California. The award for architectural excellence was given in June of this year by the American Institute of Architects. (This plant was featured by *Western Industry* in its July 1952 issue, one of a series of articles on industrial plant design and construction for which *Western Industry* won a plaque in the annual contest of the Western Society of Business Publications. *Western Industry* not only has featured individual plants, but also devoted a special section in its May 1953 issue to the Institute on Industrial Plant Design in Los Angeles.)

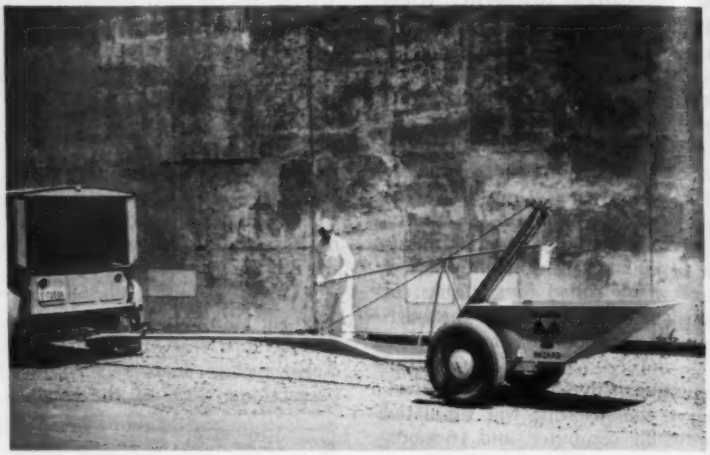
IMMORTALITY FOR PRINTS the drawing is worth its room and board at Lovequist Engineering

THE DRAWING, which is the show-how to the man with the know-how, is usually the most abused piece of property around the average machining enterprise. The average mechanic, skilled or otherwise, has little regard for the paper, other than its immediate value to the operation at hand.

Following that, the print is in most cases treated like an old shoe which has served its purpose, cast aside in a crumpled heap without any regard for its use by the next operator. It continues to take a beating in numerous departments, to be finally doctored up with yards of Scotch tape, until it finally takes on the appearance of a shell-torn battlefield. To visiting competitors or customers, it casts a reflection of carelessness or neglect on the part of the management, which might add up to a bad reputation, loss of prestige and eventually loss of business.

Martin Lovequist, president of the Lovequist Engineering Company, now in its eighth year of operation in Los Angeles, has high regard for the painstaking work of the draftsman, his finished print and its importance to the final fabrication. He has eliminated the unsightly appearance created by mutilated blue prints, through the simple process of stapling each print to its own sized board. These boards are numbered and racked, easily accessible for ready reference, each a mobile unit readily moved to the spot of operation, and just as readily returned, always in perfect condition.

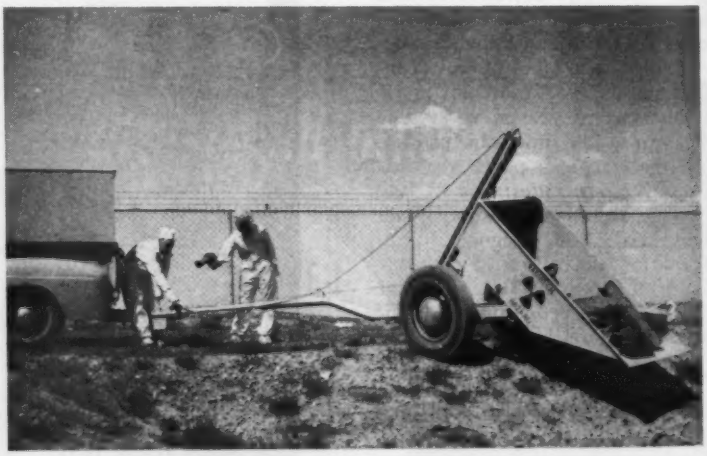
The time saved, plus the preservation of the print, plus the improvement in the general appearance of the plant, with the customer's print being returned in first class condition, is well worth the drawing's room and board at the Lovequist plant.



ATOMIC MATERIALS HANDLING

ABOVE: The operator is working with a remote-controlled trailer and tongs used by members of the Health Physics division, Idaho operations office, AEC, in handling radioactive materials. The tongs are supported by a portable tripod. Jaws, knives, or hooks can be placed at the end to perform various operations necessary in handling the radioactive materials. These tongs were developed by the division staff.

BELOW: The off-center body of the remote-controlled trailer is locked in place by a rod. When the rod is released, a hand winch connected by cable to an offset boom is used to control dumping action of the trailer.



SPECIAL SERVICE for inland shipping

PUGET SOUND Freight Lines Co. specializes in handling general cargo around the inland waters of Puget Sound, Washington. It also operates a fleet of highway trucks throughout the state.

In order to reduce costs per ton, a system of loading by lift trucks and elevators has been installed. Each vessel is equipped with a 10-ton capacity elevator which is used to raise and lower the gasoline-powered platform trucks with full loads to and from the storage areas in the ships' holds. The loads are carried on 48 x 72-in. skids from docks to the elevator platform where they are lowered into the ship's hold.

When loading is complete, platform trucks ride with the vessel in the hold storage area. Upon arrival, the elevator platform truck system is called upon to unload the cargo.

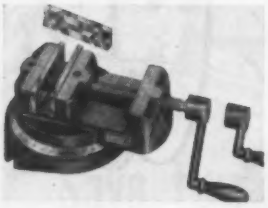
Three trucks, two low lift and one high lift, make up the normal complement of machines used per vessel. In this way, the company is not dependent on other firms to unload its commodities and provide "portal to portal" service.

NEW MATERIALS & EQUIPMENT

***USE RIP-OUT POSTCARD** for more information on products introduced this month.*

1

Milling vises with "rigidity" will mean better results



Kenco's new 6-in. milling vise is claimed to be most rugged and precision built of vises made today. This equipment affords operator maximum rigidity at all times. Vise body is secured to base by three bolts directly beneath clamped work, thus eliminating any possibility of vibration. *For a specification sheet on Kenco 6-in. plus other company products, circle key number on rip-out postcard.* Kenco Manufacturing Co.

2

Power buffing tool with many uses for industry

Magic Buffer, a new power buffing tool, fits into and is powered by nearly any portable electric drill. Originally developed to condition conveyor belts for applications of repair coatings, this buffer gives a rough or matted surface to many materials such as iron, steel, fabrics, leather, wood, concrete. It is also used in removal of imbedded rust from iron and steel surfaces. *Circle key number on rip-out postcard for more information.* Magic Chemical Co.

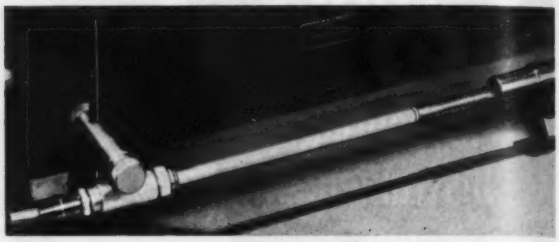
3

A time switch with a memory

New 3000 series "Memory Master" time switch is claimed to be most advanced mechanism in its field. Free movement of dial permits manual check of on-off switching operations. Dial also separates day and night and is designed for quick, easy reading. Special dial trippers are provided which need only be loosened slightly for resetting, and additional trippers can be added to provide for 16 operations per 24-hour period. This series will replace Paragon's 300 series. *For more information, circle key number on rip-out postcard.* Paragon Electric Co.

4

Tracers measure roughness in small, deep holes



A new line of six Profilometer LE-type tracers makes its mark by taking surface roughness measurements in holes as small as ½-in. ID., as deep as 24 in., and from 1 to 75 microinches roughness. Tracers may be operated by a motor-driven Mototrace, or they may be used for hand tracing. Full details and specifications are given in bulletin LT84 . . . *circle key number on rip-out postcard and send it in for your copy.* Micrometrical Manufacturing Co.

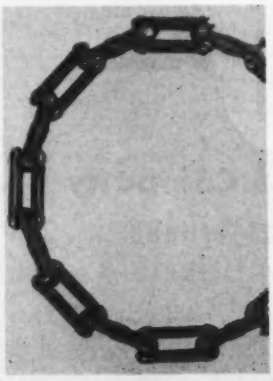
5

Work kept at working height

If you have a continuous operation at bench, press or machine height, a Lewis-Shepard Working Height Lifter may help you eliminate costly hours of bending time by keeping work at working height. Electro-hydraulically operated, it fits into any handling system. Full loads can be deposited on it at floor level and removed as a unit. Foot operated switches leave operator's hands free. *Circle key number on rip-out postcard for more information on this Working Height Lifter.* Lewis-Shepard Products, Inc.

6

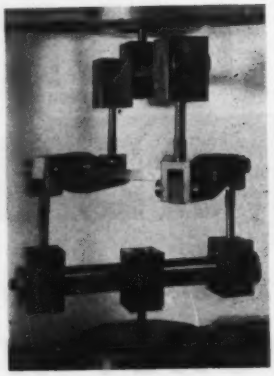
Friction at minimum with this conveyor chain



Ball and socket principle is applied to a conveyor chain in new Star Line "400" for heavy industrial use. Design reduces friction to a minimum and greater flexibility is achieved. Chain makes close spiral turns and bends vertically on a 12-in. radius. Lugs on main links prevent binding or wedging on small vertical bends. *For further information on this conveyor chain, circle key number on rip-out postcard, and drop it in nearest mailbox.* Arcturus Mfg. Corp.

7

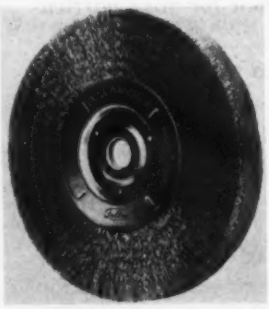
Torsion test device



For those wishing to produce pure torsion on a tension testing machine, Schaevitz torsion device will do the job. Test specimens can be twisted to a maximum angle of 24 deg. Maximum torque load is 60,000 in.-lbs., obtained by applying a 12,000-lb. tension load. Torsion device is furnished with hardened socket liners for specimens ⅜, ½, ⅝, and ¾-in. square or for round specimens with square ends of these sizes. *For more covering information, mark key number on rip-out postcard and send it off to "Western Industry."* Baldwin-Lima-Hamilton Corp.

8

A whing-ding of a wheelbrush



Here is a newly designed wheelbrush said to provide longer brush life, improved performance, increased maximum wheel speeds, insured balance and extra safety at no increase in cost. Tool can be used either singly or in multiple units. As trim wears down, sideplates can be exchanged for smaller ones, thus exposing a new length of trim and increasing brush's life. *For detailed information, circle key number on rip-out postcard and mail it today.* Fuller Brush Co.

9

That things be more widely stapled

Model H2BR, a new stapling hammer that drives a new wider staple, uses staples said to be twice as wide as those used by other medium duty stapling hammers. Application of insulation batts and roofing paper and lining freight cars are examples of jobs that this device can hold down. Hammer is especially designed for tacking where a greater surface contact is needed. *For literature on this time saving tool, circle key number on rip-out postcard and send it today.* Bostitch.

10

For sealing electrical wiring connections

A new dielectric sealer, EC-1120, developed initially for aircraft industry, is also finding its place with electrical

equipment manufacturers. Designed for use as a flexible potting compound on electrical wiring connections, it retains physical properties throughout a temperature range of —65 to 200 deg. F., and is said to incorporate excellent dielectric properties, moisture and water resistance, and durability. *Circle key number on postcard and mail it to us for literature on dielectric sealer.* Minnesota Mining and Manufacturing Co.

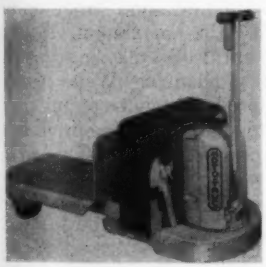
11

Wrench that locks rigid

Although Utica No. 92 Locking Wrench looks much like a standard adjustable wrench, there is one big difference—its jaws can be locked rigid at any setting. A lever, about three inches long, snaps over handle, operates on knurl, and controls jaw locking and unlocking action. In addition, Utica No. 92 acts as a vise-wrench exerting a 100-lb. grip on bolt or machine component to which it is fastened. This one wrench is termed "a kit of tools that can be carried in one hand." *For more information on Utica No. 92, circle key number on rip-out postcard.* Utica Drop Forge & Tool Corp.

12

Slicked-up truck design



Here is a tried-and-true truck, redesigned for more efficiency and better looks. Redone power unit offers easier maintenance. Unit cover can be taken off by removing four bolts, thus exposing complete power unit. Time delay device is a slow speed switch which ensures that truck operator will start in proper speed. Electric battery cables and connector are now lowered and repositioned to better protect them from damage. *For more details, circle key number on rip-out postcard and mail it to us.* Moto-Truc Co.

13

Wire braided hose made extra strong

Ironsides butane-propane hose, a new type of butane hose combining layers of horizontally braided steel wire and rayon cord reinforcement, is specially developed for handling of liquefied petroleum gases. It features a non-porous and oil resistant rubber tube and extra strong reinforcement. Each size has a minimum burst of 1,750 psi., with actual burst pressures exceeding 2,300 psi. *Circle key number on rip-out postcard and mail it today.* H. K. Porter Co., Inc.

14

Welding torch for light gauge metal parts

Model 30 is a special welding torch adapted to use with light gauge metal parts in aircraft and with non-ferrous metals. These are some advantages claimed for new item: light weight and proper balance for delicate hand opera-

tions; torch needle valves which are more easily adjusted while welding, keep cool to touch and do not cause flame distortion because of improper seating or inadequate valve stem support. An adequate and sturdy cutting attachment, Model 15, is provided for this welding torch. *Circle key number on rip-out postcard and drop it in mail for additional details.* National Welding Equipment Co.

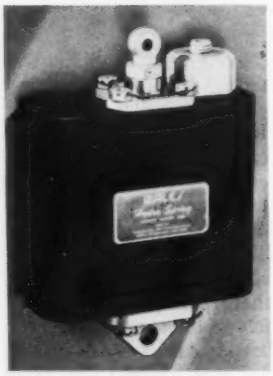
15

Powder lance for difficult piercing operations

Powder-lancing combines advantages of powder-cutting process with ease and efficiency of oxygen lance operations. Oxweld ACL-1 Powder Lance automatically mixes oxygen and powder in correct proportions to insure efficient use of this new process. Any standard lance pipe, in single or multiple lengths, can be used with this lance. Positive-pressure powder control assures excellent piercing results with multiple lengths up to 63 ft. *For more complete information on this instrument, circle key number on rip-out postcard and drop in mailbox.* Linde Air Products Co.

16

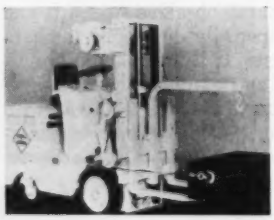
Hydra spring with outstanding load performance



Wales Tension Hydra Spring, utilizing compressibility of special fluids, pulls rather than pushes to increase load and provides built-in snubbing action on return cycle. Capacity is to 7,000 lbs., and stroke up to 2⅞-in. maximum. Loads and strokes may be adjusted by changing Wales Comproils or volume of any particular Wales Comproil. *For complete information, circle key number on rip-out postcard and put it in your outgoing basket.* Wales-Strippit Corp.

17

Eliminate die handling problems



Ira G. Perin Co. now distributes a new Elwell-Parker multi-purpose fork truck, designed for placing and removing dies from presses, and equipped with forks, a boom, and die-pulling equipment. This 4,000-lb. capacity truck handles dies weighing more than 1,500 lb., and can be used as a standard fork truck when not busy handling dies. It is 83 in. high with a 66-in. nontelescoping lift. It has 42 in. long forks and a 42 in. long boom, which are said to be easily removable. *Circle key number and mail rip-out postcard for additional information.*

18

Regenerative furnaces get automatic reversal system

Askania's new packaged automatic reversal system for open hearths, regenerative soaking pits, and glass tanks features a compact panel in which reversal controls are factory-assembled. Reversal can be initiated automatically by elapsed time or checker temperature, or semi-automatically by pushbutton, as desired. System is claimed to provide unvarying reversal sequence, with all steps electrically interlocked for safety. *For Bulletin 159 describing system and equipment, circle key number on rip-out postcard and send it to us.* Askania Regulator Co.

19

Hand truck-step ladder combo a time saver

Fairbanks Step-truk is a new combination hand truck and step ladder with numerous applications for saving time and energy. Product functions as a hand truck, with curved crossbars and a solid nose plate, and handles boxes, cartons, cases, kegs, and bags. As a step ladder, it leans into any given work. *For two-color descriptive sheet, circle key number on rip-out postcard and put it in the mail.* The Fairbanks Co.

20

Faster lift speed for three automatic trucks

A 17% increase in lifting speeds has come to three models of electric industrial trucks. Increases are possible through use of a higher speed "M" class motor replacing "K" type formerly used in 2,000, 3,000, and 4,000-lb. capacity Skylift trucks. *For more detailed information on models with extra lifting speed, circle key number on rip-out postcard and mail it to "Western Industry" postage-free.* Automatic Transportation Co.

21

Air filtering by unique method

Design 4, type N Roto-Clone dust collector is an improved hydrostatic precipitator that separates dust from air by an S-shaped water curtain. This unusual water curtain is claimed to be highly effective in collecting most types of process dust. Unit is available in three basic arrangements and in capacities from 1,000 cfm. to 48,000 cfm. *For your copy of bulletin 277 containing more information, circle key number on rip-out postcard and send it off today.* American Air Filter Co., Inc.

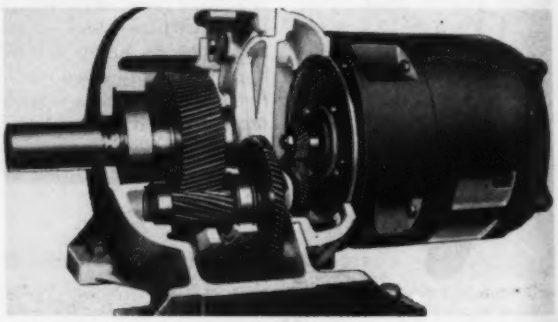
22

Two lightweights in high lift field

Two new high lift trucks in light weight, low cost fields, first of their type to be built by this firm, are designed to solve low load limit problem on elevator floors. Model D-15 is a counterweighted high lift having a capacity of 1,500 lb., while truck itself weighs only 1,700 lb. Standard model has an 84-in. lift. Model DS-20 is similar to D-15 but balance is maintained by stabilizing outriggers which project forward on each side of load. *For new 12-page catalog, circle key number on rip-out postcard and mail it today.* The Knickerbocker Co.

23

Motors with built-in speed to fit your need



Extending its line of gearmotors, Century Electric Co. introduces a complete new integral gearmotor series from one to 15 hp. These motors are offered in a wide range of speeds in single, double and triple gear reductions. Gears meeting AGMA classes I, II, and III specifications can be had to fit varying load requirements. *For bulletin containing illustrations, operating data and application information, mark key number on rip-out postcard and drop it in your outgoing basket.*

24

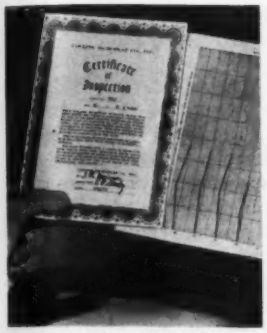
Fresh-off-the-assembly-line fork lift trucks

Buda now has two brand-new 7,500-lb. capacity fork lift trucks, models FT75-24 (gasoline powered) and FTD-75-25 (diesel powered). Modernly styled, trucks have a quick "wide open" type design in which all side panels, rear and top, can be easily removed for quick accessibility to all parts. They each have a 12-in. diameter industrial

type clutch which can be changed in approximately 30 min. *For more information on Buda's new fork lift trucks, circle key number on rip-out postcard.* The Buda Co.

25

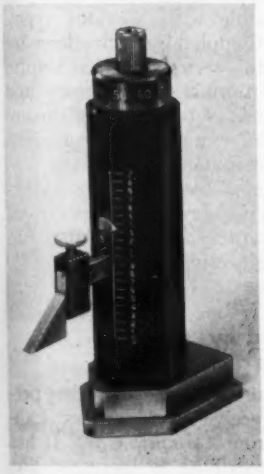
Certification of surface plate accuracy



Since degree of accuracy in a surface plate, of utmost importance to inspectors of precision work, must be determined prior to plate's use, Collins Microflat Co., manufacturer of black granite surface plates, is now introducing a certification of accuracy to accompany each plate. By use of an autocollimator, optical readings are made of each plate required to meet extreme precision requirements. *For your specimen copy of certificate, encircle key number on rip-out postcard and send, postage free, to "Western Industry."*

26

For quicker, more accurate gauging



You can take a direct reading by hundredths on barrel and by thousandths on dial of this stubby height-gauge. Accurate layouts up to 6 in. are claimed obtainable with use of gauge and toolmakers 1-2-3 block. Measurements are taken from bottom of base for scribing. Precision made, it is said to be an ideal gauge for quicker, more accurate work by toolmakers, inspectors and layout men. *For more complete details, circle key number on rip-out postcard.* Electrolizing Sales and Tools, Inc.

27

Electric impact wrench increases work speed

This new ½-in. square drive electric impact wrench can be used with a variety of sockets and attachments and is said to greatly increase working speed of any maintenance man. It is claimed to remove or install series of nuts in a fraction of time needed by standard hand tools. It can also be used for driving gear pullers, stud removers, all types of screwdriver bits, hole saws, structural reamers, and steel, wood or mortar bits. *For details, circle key number and mail rip-out postcard.* Snap-On Tools Corp.

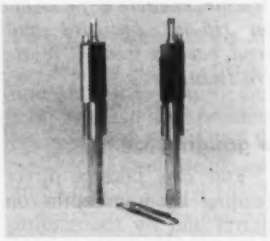
28

WorkLifter is battery operated for mobility

WorkLifter, a new piece of M-H equipment, will raise loads of 750 to 1,000 lbs. to a height of 5 ft. It is battery-operated, and thus, manufacturer claims, may be used anywhere at any time. Two heavy duty batteries connected in series provide sufficient power for day-long continuous duty or several days of intermittent use. Machine has a foot-operated type floor lock. *Circle key number on rip-out postcard for additional information on WorkLifter.* Economy Engineering Co.

29

Galloping galvanometers



Improved techniques of balancing and a redesigned suspension system are combined in new Series 7-300 Recording Galvanometers to give rigid control over linearity, sensitivity, damping balance, and zero stability. Fourteen individual models in this series offer flat frequency ranges from 0.11 cps. to 0-3,000 cps. Both installation and adjustment are said to be accomplished with greater ease than possible with previous types. Complete specifications for this series as well as helpful information on theory and use of recording galvanometers in general is contained in bulletin CEC-1538 . . . *send for your copy by circling key number on rip-out postcard.* Consolidated Engineering Corp.

30

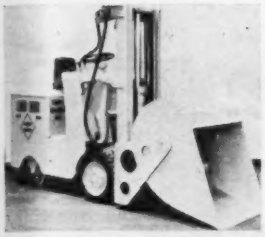
Butane-propane hose listed by Underwriters' Laboratories

First butane and propane hose for engine and other permanent-type applications to receive Underwriters' Laboratories listing is type 1533 from *Aeroquip Corp.* It has several design features that contribute to increased life, improved utility and greater safety. Said to be light in weight, flexible, and easy to handle, this hose is impervious

to all LP gas products and permits flexing at temperatures as low as 45 deg. F. without cracking or leaking. *For more details circle key number on rip-out postcard and drop it in outgoing mail.*

31

M-H scoop attachment



A scoop attachment, designed for use on any of its hydraulic-powered fork trucks, is a new development of *Elwell-Parker Electric Co.* This attachment is specifically designed for handling such bulk materials as fine coal, salt, grain, etc., but is not intended for loads where lumps are large. It receives its hydraulic power from same system which operates vehicle's lift and tilt. *For more information, mail rip-out postcard with key number circled.*

32

Conveyor folds in half for easy storage

Here is a sturdily built, low cost portable conveyor that has a power operated safety screw lift and lowering device. Unit is said to raise to any angle, is ideal for use by itself or with other types of conveyors for stacking, storing, loading and unloading bags, boxes and cartons. It can also be used to transmit packages from floor to floor when elevators are not available. It comes in four sizes. *For full details, circle key number on rip-out postcard.* Frank A. Kremser & Sons, Inc.

33

Cooling tower design undergoes improvements

Santa Fe Tank & Tower Co. has taken an aggressive step toward developing a cooling tower, "MD-54," with a substantially improved construction design. This tower is said to require fewer parts for construction, allowing for faster erection and less maintenance. The tower's basic design provides for largest possible range of size variations. *For other cooling tower information, circle key number on rip-out postcard and mail it to us.*

34

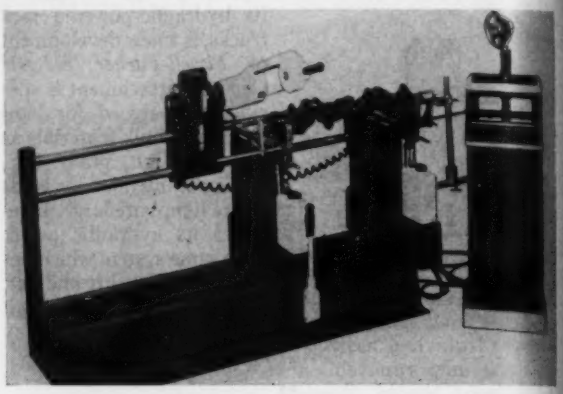
A compound for better welding

A silicone weld-backing compound, now available from G-E welding distributors, is said to permit greater welding flexibility by effectively promoting uniform penetration and

eliminating harmful effects of air on underside of welds. It is well suited to applications in which underside of joint is difficult to reach for cleaning. One coat, ½-in. wide, applied with a brush to back of joint, will be adequate protection. *For details, circle key number on rip-out postcard . . . mail it today.* General Electric Co.

35

For good balance



Quick set-up (less than two minutes) plus extreme capacity range are said to make new Model 704 Stewart-Warner electronic industrial balancer excellent for maintenance and production balancing. By eliminating vibration, cutting speed and operator safety may be increased. Precision sensitivity is possible at all weights of items checked or balanced from range of ½ lb. to 1,000 lb. *For additional information, circle key number on rip-out postcard and send it to "Western Industry."* Merrill Engineering Laboratories (Dept. 34-A).

NEW MATERIALS AND EQUIPMENT IN BRIEF

36

MOBILE HECO SAFETY WORK PLATFORM is something new and needed by industry. Used in conjunction with a fork lift truck, this latest Heco device is said to provide immediate and easy work access at any fork lift elevation. No set-up or erection is necessary. Claimed ideal for construction work, industrial plants, machinery repair, aircraft factories and other industries, this platform is both a time and labor saver. *For further information on mobile platform, circle key number on rip-out postcard.* Hamerslag Equipment Co.

37

A NEW DEVELOPMENT IN MATERIALS-HANDLING FIELD is this warehouser electric rider-type straddle truck that permits 4½-degree backward tilting of loads without affecting unit load capacity. As load is raised on this truck, it is tilted automatically by a cam on upright channels. Backward tilting insures great load stability and is particularly desirable with lightweight or awkwardly-shaped loads or for use on rough floors. *For more specific information on this straddle truck, circle key number on rip-out postcard.* The Yale & Towne Manufacturing Co.

38

A NEW 1,000-KW. PORTABLE DIESEL GENERATOR SET, recently added to Enterprise line, is wholly self-contained on a skid mount. Fuel tanks, cooling radiator, control panel and all necessary gear are mounted on a common skid. Unit can be ocean shipped or trailer transported ready for generation of electrical current on arrival. *For more detailed information, circle key number on rip-out postcard.* Enterprise Engine & Machinery Co.

39

DFXE-TS is a turbo-supercharged version of Hercules Motors' six cylinder diesel engine model DFXE. Engineering features include: forced feed lubrication by gear pump to all connecting rods, main bearings, piston pins and rocker arm bearings; seven-bearing, counterbalanced, Tocco hardened crankshaft; and high alloy steel valves with valve rotators. *For further engineering information, circle key number on rip-out postcard.* Hercules Motors Corp.

40

A NEW PATENTED SNAP-TYPE FASTENER for holding airplane fuel cells in place

Postage Will be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD
First Class Permit No. 3755, Sec. 34.9, P. L. & R., San Francisco, Calif.

WESTERN INDUSTRY

609 Mission Street

San Francisco 5, Calif.

USE A POSTCARD for THESE THREE FREE SERVICES

1. For your free copies of **HELPFUL LITERATURE** reviewed in this issue, circle appropriate key numbers.
2. For more information on **NEW MATERIALS AND EQUIPMENT** previewed on following pages, circle key numbers.
3. For complete information on **PRODUCTS ADVERTISED** in this issue, fill in page number and name of advertiser.

Send free booklets and more information on new products listed under circled key numbers:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

Send complete information about products advertised on:

Page..... **by**.....

Page..... **by**.....

Page..... **by**.....

Name.....

Address.....

.....

Position.....

Organization..... **OCT. 1953**

Send free booklets and more information on new products listed under circled key numbers:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

Send complete information about products advertised on:

Page..... by.....

Page..... by.....

Page..... by.....

Name.....

Address.....

.....

Position.....

Organization..... OCT. 1953

New products and manufacturers' booklets reviewed in *Western Industry* are screened and selected for your needs. The advertisers in *Western Industry* call your attention to important services and developments available to Western firms in this period of dynamic growth. Take this opportunity for aid in keeping your business in step with this growth.

YOUR REQUEST on a POSTCARD

will result in our prompt and thoughtful action.

There is no obligation to you for this service.

Postage Will be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD
First Class Permit No. 3755, Sec. 34.9, P. L. & R., San Francisco, Calif.

WESTERN INDUSTRY

609 Mission Street

San Francisco 5, Calif.

without piercing cell wall on installation is called Waldes Positive Lock Fastener. Consisting of three major components, stud, sub-assembly, and aluminum washer, and a housing sub-assembly, fastener may be used in any position and can be applied on inclined surfaces at any angle. *For sample of fastener and descriptive catalog, circle key number on rip-out postcard.* Waldes Kohinoor, Inc.

41

AN AUTOMATIC RECLOSING RELAY (RC) with a built-in instantaneous trip lockout feature is now available to industry. Intended primarily for automatic control of circuit breaker's reclosing operation, RC will prevent repetitive tripping due to action of instantaneous trip of protective relay. This feature is especially desirable where feeders are sectionalized by fuse operation, since closed circuit breaker will then allow fuse to clear faulted feeder. *For more material on this relay, circle key number on rip-out postcard and drop it in nearest mailbox.* Westinghouse Electric Corp.

42

RIDGID "504" PIPE THREADER for use on power drives is recent addition to line of pipe tools made by Ridge Tool Co. Threader is self-contained and is said to be quickly and easily adjusted to thread 1- to 2-in. pipe using only one set of dies. Dies can be adjusted without removing threader from machine. There is no lead screw to wear out. *Circle key number on postcard for more complete information.* The Ridge Tool Co.

43

A NEW TYPE GAS SAMPLING PUMP for use in conjunction with gas analyzing equipment is now available to industry. Since gas is never in contact with metal, and since design of pump eliminates stuffing boxes and shaft seals, there is no possibility of either contaminating gas or of gas leakage from pump. *For additional information on these pumps, circle key number on rip-out postcard and drop it in a mailbox.* Vanton Pump Corp.

44

CLAIMED SURE-FIRE FOR NARROW AISLE OPERATION, powerful "one-man" Safeway hydraulic lift truck is designed for maximum safety. Said to lift loads of 1,000 lbs. to a height of 53-in., it will also turn easily in close quarters. Combination snap-on plate permits use as platform truck when forks are not required. *Circle key number on rip-out postcard for free literature on this machine.* Safeway Industrial Equipment Corp.

HELPFUL LITERATURE

for the plant operator who wants to keep informed

45

Three bulletins on stackers for close-quarter operation

Three bulletins, covering Transveyor Stacker riding-type electric industrial trucks are published by *Automatic Transportation Co.* These four-page brochures contain complete specifications for 2,000, 3,000, and 4,000-lb. capacity trucks.

46

Flexibility in expansion joints and metal hose

A sixteen-page illustrated two-color catalog featuring Chicago metal hose and Flexon expansion joints is a new release from *Flexonics Corp.*, formerly Chicago Metal Hose Corp. Publication presents all basic selection and installation data necessary for proper application of hose products. 71/F1

47

Dry-type distribution transformers now in print

Wagner Electric Corp. makes available a four-page bulletin illustrating and describing in detail, new Wagner line of dry-type distribution transformers. Transformers thus presented are class B in ratings 3 through 100 kva, single-phase, 600 volts and below. Pictures of models are presented along with characteristics of these lines. EU-106, No. 12.

48

Big sweep saves man hours

Wilshire Power Sweeper Co. offers a two-color folder complete with a chart showing man-hour savings per hour when cleaning is done with this company's power sweepers. Eight models are pictured with accompanying application illustrations. Complete data on model and size best suited to your needs will be supplied upon request. S-100

49

Specifications given for front-end loaders

Complete specifications for Baker-Lull 4B front-end loader mounted on various models of *R. H. Sheppard* industrial-type tractors are given in a two-color catalog sheet available from *Baker-Lull Corp.* Literature covers R. H. Sheppard SDI-1, -2 and -3 series and lists materials handling tools available with Shoveloader. A description of Sheppard fuel injection system is also included. A5202-1

50

"Tower-Coater" bulletin

John Waldron Corp. has recently printed a two-color folder with sketches and photographs illustrating a few arrangements possible under classification of tower coaters. On last page, Waldron products are listed, and doors of concern's research and engineering laboratory are opened to Waldron customers. 1006

Circle key number on rip-out card for literature you want

51

Versatile tool for precision cutting is described

Here is a well done brochure on *Waldes Kohinoor, Inc.'s* Truarc grooving tool which seems to offer an unusually wide range of possibilities for precision cutting of recesses in housings and bores. An index run-down is indicative of territory that is covered: general information, cutting range, accessory parts, specifications for use —varying conditions, general dimensions, set-up and adjustment, replacement parts, typical applications, how to order, cutting speeds, and conversion tables. gt 2-53

52

Precise measurement with manually-operated indicators

Complete information, about how manually-operated portable and panel indicators are being used for precise temperature measurement, electrolytic conductivity or pH, is contained in a 24-page brochure just published by *Leeds & Northrup Co.* In this publication, instruments are arranged according to application, and circuit diagrams show how they operate. Each indicator is pictured, and typical installation photographs are included. ND42

53

On hydraulic motors, power steering booster and variable speed transmission

Vickers Inc., now offers an interesting set of literature. Bulletin M-5103 is concerned with company's balanced van type hydraulic motors. With characteristics of line mentioned, it presents blueprints of four series and winds up with a performance curve for each. Also available are two specification sheets: M-5104 is on Vickers hydraulic power steering booster, and 47-40a covers firm's variable speed hydraulic transmission.

54

A page of snap-action relay

Here, in one page, is excellent coverage of information applicable to Belmont type C relay, a rugged-service relay suited to plate-circuit application with such thyratrons as type 2050, 2D21, and 502A. Specifications include: overall dimensions, weight, frame, armature, core, coil, and power requirements. *Thermo Instruments Co.* C-1-753

55

Car pullers—info in bulletin form

Stephens-Adamson Mfg. Co. can immediately bring you up to date on various kinds and types of S-A car pullers with its new eight-page, illustrated publication on same. Brochure

gives a run-down on selection of proper sizes, plus pictures, diagrams and features of various kinds of capstan type wire rope car pullers. Final few pages are catalog in character and cover car puller sheaves, ropes, hooks, wire rope blocks, etc. 753

56

M-H equipment done up in brochure form

A new piece of literature from manufacturing division of *Geo. M. Prescott Co.* covers ground on Dreadnought materials handling equipment including Buschman portable conveyor. Pictures, specifications and price lists are included for skids; semi-live skids; semi-live skid jacks; box rings; platform, mattress and hand trucks; dollies; and conveyors.

57

For edification, a new edition on refrigeration

A completely revised edition of "Trane Refrigeration Manual" is published by *The Trane Co.* These spiral-bound 125 pages present practical, easy-to-understand information on installation, operation and servicing of refrigeration equipment for contractors and servicemen. It contains two new chapters on refrigeration piping. Other changes include a new chapter on refrigeration system control, a revised chapter on service operation and a revised refrigeration system service analysis chart.

Circle key number on rip-out card for literature you want

58

Electric clutch control for power machines

A 12-page, two-color brochure on Microtrip control will tell you just how this device will *safely* speed production. Two extensive charts give to-the-point information on Microtrip controls and auxiliaries and on Microtrip control accessories. Booklet illustrates and describes each piece of equipment. Micro, a division of *Minneapolis-Honeywell Regulator Co.* 59

59

About "Mass Spectrometer Analytical Service"

Specialized problems in chemical analysis, process monitoring, isotope-ratio determination, and high-precision leak detection, which occur too infrequently to justify purchase of special instruments, can now be solved in *Consolidated Engineering Corp.'s* analytical service department. Here a permanently staffed laboratory is available to you on a per-analysis basis. By circling key number on our rip-out postcard, you will receive a copy of CEC's bulletin giving detailed information on these analytical and computing services. 1813A

60

Information on insulation—metal buildings type

Insulation of metal buildings with superfine blanket form of fiber glass is subject matter of a new descriptive folder issued by Fiber Glass division of *Libbey-Owens-Ford Glass Co.* Folder shows pictorially three standard methods for applying insulation for combined heat and noise control to industrial and commercial structures. A complete standard chart is given for use of architects, engineers and technicians. Also included are charts on sound absorption and data on thermal conductivity.

61

Modernized disconnecting switch described

"PMB-236" disconnecting switch for group operation, an old standby of early days that has since been completely modernized with many new features, is described and illustrated in a folder just released by Delta-Star Electric division, *H. K. Porter Co., Inc.* Complete listings and dimensions for these switches are given in all standard voltage ratings from 7.5-kv., 400 amperes to 161-kv., 1,200 amperes. 5305

62

An education on industrial rubber linings

In a folder type publication, *Latex Dipped Products* manages to present a quantity of information on Blue Diamond industrial rubber linings. It first sums up this process, hits on specifications and characteristics of Blue Diamond's rubber linings, mentions testing, lining methods, vulcanizing, testing curing process, and physical properties of Blue Diamond linings. Applications are mentioned as follows: tank linings; pipe, fitting, and valve linings; and fan, blower, and duct work linings.

63

Printed matter on pitot tubes

A technical bulletin on Meriam pitot tubes is now offered by *The Meriam Instrument Co.* This eight-

page illustrated brochure completely describes tube construction, principles of operation, application, and installation. 51

64

For better operation of cooling tower fan drives

An attractive folder from *Lufkin Foundry & Machine Co.* gives complete rating tables for company's type VB spiral bevel gear reducers, designed for cooling tower fan drives. Final page shows type VB reducers' general dimensions plus several diagrammatic views of this device. G-2

65

Lunkenheimer gives info on bronze gate valves

The Lunkenheimer Co. now has available for you two illustrated circulars describing its line of 150- and 200-lb. S. P. bronze gate valves. These circulars, complete with dimensions, state advantages of flange and screw gate valves equipped with either double or solid nickel-alloy wedge discs in rising stem designs and with a single wedge disc in non-rising stem types. 534-8-53-10M 574, 8-53; 10M

66

Lit. on surface hardening stainless steels

It may pay you to investigate Malcomizing if you use surface hardened steel parts in your finished product. Process is said to impart increased wear, abrasion, corrosion, and erosion resistance to stainless steels. *Lindberg Steel Treating Co.'s* new 28-page booklet, "Malcomizing" will give you a complete story of this process.

67

A "time clock" for machinery

When is your machinery busy? When is it idle? How long did it remain idle? How long was it actually in operation? Think how valuable this kind of information would be to your operations. So that you won't have to stand behind a post to get it, there is a "time clock for machinery," Servis Recorder, that will get it for you. Read all about this handy device in a two-color brochure put out by *The Service Recorder Co.*

68

How you can increase automatic welding speeds 50%

The Lincoln Electric Co.'s folder on Lincoln Twinarc automatic welding sets out to explain claim that Twinarc will increase speed, improve quality, and cut welding costs. There is a chart on electrode positions that can be selected for efficient Twinarc welding

depending on type of work. Speeds and procedures are given for this type of welding complete with diagrams and figures. 1328 5M 2-53

69

RMB miniature ball bearings—read about all types and sizes

Landis & Gyr Inc. now put out an eight page bulletin including specifications and diagrams on following kinds of ball bearings: pivot and angular contact types; radial ball bearings; sealed miniature bearings; radial ball bearings; roller and special types. Last page gives design data including: bearing tolerances, housing and shaft, housing fits, shaft fits, fits for extra light series; and calculation of load capacity. 8

70

Engineering data on ball bearings and other anti-friction products

Here is a well done catalog, put out by *Nice Ball Bearing Co.*, which will give readers a good idea of this firm's products. First few pages are taken up by special bearings for unusual requirements, general engineering information, and terms. A unique chart on table of contents page points way to various bearing types. Publication winds up with numerical index of bearing numbers and a decimal equivalent chart. 150

71

Bulletin boosts Billmyre blowers

Billmyre Blower division, *Lamson Corp.*, publishes a two-color, 32-page bulletin which both catalogs division's products and includes information on centrifugal blowers and exhausters for air or gas handling. Typical applications of Billmyre blowers are illustrated and described to indicate wide variety of uses for this equipment. B-6

72

The right angle on solid shaft gear drives

Here is a fine catalog type publication condensed into eight pages that will give you latest word on gear drive selection. Intelligible charts, graphs and drawings are presented to enable you to pick up information that is applicable to your job in quickest manner. Johnson right angle gear drive's salient features include materials, design, and lubrication. 24

73

"How to Operate a Lift Truck" in one easy lesson

A fifth edition of *Hyster Co.'s* booklet on lift truck operation is now available to lift truck operators, supervisors, safety engineers and other interested industrial and governmental personnel. Two-color cartoon technique employed is designed for easy reading and is packed with information about operation, preventive maintenance, safety and basic materials handling. Drawings for setting up an obstacle course are also included.

74

"The Care and Maintenance of Steam and Hot Water Unit Heaters"

With fall upon us, it is time to examine heating systems to make sure that they will give satisfactory and efficient service. To assist those responsible for proper functioning of heating systems, *Industrial Unit Heater Association* offers its four-page, illustrated bulletin which clearly explains just how to take care of heaters. 12

Circle key number on rip-out card for literature you want

75

Data sheet on automatic battery chargers

Seven multiple-circuit Hobart motor generator chargers covered by this data sheet are of five through 30 kw. capacity. Each unit is designed especially for batteries that it is intended to charge according to ampere-hour ratings listed under "applications," (lead-acid and nickel-iron-alkaline). Specification information includes motor generator assembly, generator, excitation, motor, controls, charging panel, and general construction. *Motor Generator Corp.* MGC-101

76

Tubular conveyors hit print

Here is a good thick catalog type publication that will give you full story on Hapman conveyors. First off is a general description of this equipment with a list of types of materials that can be handled (impressive). Following this information comes: typical installations; a check list of advantages; engineering and construction design details; weight-volume-time conversion, and conveyor capacities conversion charts; installation and operating instructions; customers data sheet; and applications which include metalworking, chip and dust handling, and a series of case studies. *Hapman Dutton Co.* HC-451

77

Brochure of insulation information

Keasbey & Mattison Co. now offers a booklet listing and describing various K & M asbestos insulations designed in interest of economy, temperature and comfort. Info on use, composition, dimensions and physical characteristics are given for each one. Final pages are devoted to: a chart on thermal conductivity of insulations; tables of feet, sections and weights per carton of firm's pipe insulations; and tables of recommended thicknesses.

78

Reasons for locating industrial plants in Utah

Brochure of *Utah Committee on Industrial and Employment Planning* puts forward and analyzes eight advantages Utah offers industrial enterprises, with supporting data and statements of persons acquainted with state.

79

Gas engines that are light weight but heavy duty

Eight-page two-color bulletin issued by *Nordberg Manufacturing Co.* gives construction and operating data on Nordberg 4-cycle Supairthermal V-type stationary or marine engines. These 13-in. bore and 16½-in. stroke engines meet need for high-power heavy-duty diesel, duafuel or spark-fired gas engine of moderate weight and small dimensions. Bulletin includes weight and ratings of both 12- and 16-cylinder engines, schematic cross-section, and dimensional line drawings. 197

Circle key number on rip-out card for literature you want

80

A check list for greater savings

A new 4-page folder containing a check list "to greater savings in Oil Industry Maintenance Welding" is issued by *Eutectic Welding Alloys Corp.* Various salvage and maintenance applications are discussed, from drill bits to crown block showing precautions and procedures recommended for efficient welding operations in this industry. TIS 1706

81

Booklet promotes Work-O-Matic system of materials handling

Union Metal Manufacturing Co. uses 12-page two-color illustrated booklet to show materials handling containers and filling and dumping units. Work-O-Matics pictured and explained include multi-duty boxes and trays, bin boxes, gravity-fed hopper, and end loading scoop. 83

82

Anatomy of a gasoline platform truck

Two-color folder from *Elwell-Parker Electric Co.* contains engineering drawings giving detailed dimensions of its 6,000-lb. two-wheel drive, four-wheel steer platform truck, Type GEP-6. It also sets forth operating and construction features. Application photos show truck handling various types of loads.

83

Here's a hydraulic controller for automatic pressure, flow and proportioning

Bulletin of *Askania Regulator Co.* describes operating principles of Askania unit regulator, shows different models of unit and illustrates typical applications with schematic drawings.

Industrial uses range from combustion control for metallurgical furnaces to measurement of electric variables.

84

Case histories in photo style

Lewis-Shepard, Inc., adds two new case history folders to those issued earlier, which cover specific materials handling operations using industrial trucks. These two cover chemical and electrical equipment industries. Previous issues are concerned with food, motor freight, bottling, paper, cold storage, warehousing and paint fields. Entire group is available upon request.

Circle key number on rip-out card for literature you want

85

"Warehouser"

Four-page folder published by Yale Materials Handling Division, *Yale & Towne Manufacturing Co.*, gives complete specifications for "Warehouser" electric rider straddle truck. Designed for narrow-aisle tiering, truck is available in two standard models: 2,000 and 3,000-lb. capacity. 1535A

86

Engineering data on Cutless rubber bearings

New brochure on application and use of *B. F. Goodrich* Cutless rubber bearings in industrial equipment is put out by *Lucian Q. Moffitt, Inc.*, national distributor. Rubber bearings are recommended for pumps, agitators and similar machinery where bearings can be lubricated with water or by liquid handled in equipment.

87

Electronic metal detector is your private eye

Folder of Industrial Electronics section, *Radio Corp. of America*, presents RCA electronic metal detector, which inspects for metal particles in food, plastics, paper, rubber, textiles, explosives and other products. Operating features are listed, together with general specifications.

88

F, D, and S in industrial V-belts

Flexibility, durability and strength are watchwords applied to its V-belts by *Durkee-Atwood Co.* in a well-done 60-page catalog of these products. Standards are presented in it that bear out firm's claim. Comprehensive in nature, book includes nicely displayed charts, tables, drawings, pictures and text that will bring you as close to three-dimensional equipment as two-dimensional media can do it. D-161A

89

Seven questions you should ask . . .

. . . and answers to them may well influence your choice of a power sweeper. Here they all are—both questions and answers plus regular brochure information that backs up Tennant 75's claim of being "the fast, heavy-duty sweeper built for *years* of service." Circle key number on rip-out postcard for your copy of Bulletin 85.2. Info sheet 85.3 will give you the low-down on same firm's power sweeper Model 36. *G. H. Tennant Co.*

90

Bulletins available on gaging equipment

New descriptive sheets on Indi-Ac electronic indicator, Par-Ac electronic production gage and Micro-Ac electronic micro-comparator are available from *Cleveland Instrument Co.* These bulletins define fields of application for each instrument, show equipment in use, and describe each unit. Controls and adjustments are identified, meter scales are shown actual size, and detailed specifications are included.

91

Motorized lift truck batteries for extra use

A bulletin from *C & D Batteries, Inc.*, will tell you company's Slyver-Clad battery does more work, lives longer, and costs less to operate. A specification chart is included to assist you in determining which type will give best service for your particular job.

92

D. I. P. for hot and cold

Durant Insulated Pipe Co. has for you material explaining why its pipe can be used satisfactorily in underground and weather-exposed locations for conveyance of hot or cold liquids and gases. Folder goes into application and special features and facts on this pre-sealed insulated pipe. It also presents field joint procedure, and gives details on construction and fabrication complete with clear drawings. 6C/Du

93

Folder on 3-D scale models to help you plan your plant

Designed by *South Bend Lathe Works* to make available a modern

method of shop layout, model planning kit described in bulletin 5301 provides a means for shop officials to avoid costly guesswork. This four-page, two-color bulletin outlines opportunities offered by 3 dimensions over 2-D blueprints. Pictures show how, on your own desk, "layout engineering" can be scaled down in size with original outfitting or retooling seen in miniature exactly as it will be when installed.

94

Vapor-Wrapper samples

Kit contains actual samples of various weights and grades of Nox-Rust volatile corrosion inhibitor treated papers for military and industrial packaging. It also contains samples of different sizes of bags for packaging or storing of small metal parts subject to corrosion. Accompanying catalog tells what it is, how it works, and how it saves in rust prevention costs. *J. W. Guthrie Co.* Circle key number on rip-out postcard for free kit.

95

36-page welding brochure

National Welding Equipment Co. offers 36-page welders equipment catalog giving specification and operating data on complete line of National torch tips, torches, extensions, regulators, gauge assemblies, valves, hose connections, adapters and accessories. Selector charts give unit recommendations for various work ranges. CW 19-5

Circle key number on rip-out card for literature you want

96

Gas-electric furnaces in 40 pages

Westinghouse Electric Corp. offers 40 pages of complete engineered application data on its line of 12 standard types of industrial electric or gas fired furnaces. Booklet also contains atmospheric tables for heat-treatment of different metals, table of controlled atmosphere applications, table of material handling methods in furnaces, performance ratings for various processes, and Centigrade-Fahrenheit temperature conversion tables. Good stuff. B-5459

97

Supreme lighting

Here is a better than well done guide book showing *Supreme Lighting Co.'s* standard products together with necessary engineering information. A most important feature is inclusion of all technical data on catalog page. Book is designed to give information logically and quickly. Text type is easily read, and special matte paper is restful to eyes. Information is given on commercial, recessed, industrial, and strip and residential lighting. aia 31f23

98

The "what" and "where" of electroforming

Two questions, what is electroforming, and where may it be used to advantage, are answered in a bulletin published by *Bone Engineering Corp.* An extra "w" is thrown in for good measure, and the answer to "who is Bone Engineering Corp." is given to round off this brochure.

99

Published info on Mult-A-Frame

Ground is covered pretty thoroughly on various types and sizes of channel frame and fittings in a new brochure, issued by Mult-A-Frame division of *Ainsworth Manufacturing Corp.* It contains installation photographs, supplies engineering data charts, and gives information on how and where to buy.

WESTERNERS AT WORK

ARIZONA

Phelps Dodge Corp.

J. B. Pullen becomes assistant general manager of Douglas branch, taking over duties in the office of general manager *Charles R. Kuzell* and assistant general manager *W. C. Lawson*. He transfers from post of manager of New Cornelia branch at Ajo, in which he is succeeded by *A. T. Barr*, formerly general superintendent.

Inspiration Consolidated Copper Co.

Richard S. Newlin is elected president of this Miami company, succeeding *William D. Thornton*, deceased. Newlin was former vice president.

Utah Construction Co., Stearns-Roger Mfg. Co.

Otto Duke of Tucson leaves employ of Combined Metals Reduction Co. to become associated as design engineer with these companies, who have contract to design and build a complete mill and copper smelter for San Manuel Copper Corp.

Southwest Lumber Mills

J. B. Edens becomes president, succeeding *J. E. Clifford*, elevated to chairman of executive committee. *Freeman Schultz* elected vice president Flagstaff division, *Richard L. Kemp* vice president of McNary division.

CALIFORNIA

Bacon Vulcanizer Manufacturing Co.

Donald G. Malcolm, recently vice president in charge of production of this Oakland firm, joins operations research office of Johns Hopkins University at Chevy Chase, Md., to conduct research on the science of management decisions.

Bank of America

Robert R. Dockson, regional economist for this San Francisco bank, goes to University of Southern California to become professor of marketing.

Glass Container Manufacturers Institute

New assistant West Coast manager is *Frank H. Wright*. His headquarters will be in San Francisco.

Caterpillar Tractor Co.

H. O. Nelson, employee relations manager of company's San Leandro plant, is promoted to same position in new plant to be built at Decatur, Ill.

Arthur C. Withrow Co.

Howard L. Farrow joins this Los Angeles lubricant firm as plant manager. He comes from Richfield Oil Corp., where he was lubricants research supervisor.

L. J. Knight

F. G. Sawyer

Western Gear Works

Captain L. J. Knight, Jr., is appointed engineering consultant of firm's Lynwood works.

Ralph M. Parsons Company

Frederick G. Sawyer joins staff of Los Angeles firm to handle special projects in chemical and petroleum engineering and technical public relations. Was Assistant to the Director of Research at Stanford Research Institute. Has served as chairman of Northern California Chemical Market Research Group. Previously Pacific Coast editor for American Chemical Society publications.

Bethlehem Pacific Coast Steel Corp.

F. Robert Preece, formerly engineer for Bethlehem Pacific's Los Angeles area, is appointed district engineer, fabricated steel construction, for San Francisco area. He will maintain offices at concern's Alameda fabricating works.

General Petroleum Corp.

Nevin L. Shade, previously chief draftsman for firm's marketing department, Southern California division, advances to post of construction superintendent of this department. He will continue to make his headquarters at offices in Vernon.

E. W. Bullard Co.

E. W. Bullard, president of San Francisco company which manufactures industrial safety equipment, is appointed to research committee of President Eisenhower's Committee on Occupational Safety. This is a commission estabished to maintain a workable standard safety code in all U. S. industry.

Fibreboard Products, Inc.

Ralph P. McDonald is named general production manager of firm with headquarters in San Francisco. He is replaced as assistant resident manager of Antioch division by *Dr. R. W. K. Ulm*, formerly technical director of San Joaquin division.

Stanford Research Institute

William A. Casler joins Institute as assistant director of economics research. He was formerly associated with Armour Research Foundation of Chicago. *Dr. Marjorie W. Evans*, previously with Armour Research, comes to Institute's department of chemistry as a physical chemist. *Ilia George Poppoff*, now associate physicist in air research section, was, from 1948 to 1953 a

member of U. S. Naval Radiological Defense Physics Laboratory in San Francisco. *William H. Breen,* physical chemist, is newly assigned to Institute's air research section. He has lately been on chemistry staff of U. S. Army Chemical Corps at Dugway Proving Grounds, Utah. *Dr. Carsten C. Steffens,* assistant director of Institute from 1947 to 1949, rejoins staff as technical coordinator of research divisions. He has been associate professor of chemistry at University of New Mexico. *Dr. Francis R. Holden,* formerly of U. S. Naval Radiological Defense Laboratory, San Francisco, joins chemistry staff at Institute, to work on atmospheric and radiological research.

Santa Fe Tank & Tower Co.

Jack Slough joins Los Angeles firm as assistant chief engineer.

Southern Pacific Milling Co.

J. Will, formerly vice president in charge of aggregates operations, is newly elected president of this Santa Barbara company. He succeeds *W. H. Mathews* who will continue as a member of firm's board of directors.

National Motor Bearing Co., Inc.

This Redwood City firm promotes *Ralph Zimmerman* to position of chief product engineer. He was formerly a career product design engineer.

Ralph Zimmerman

A. W. Morgan

Consolidated Vultee Aircraft Corp.

Paul S. Nill is named controller for Convair's San Diego division. He was formerly division's manager of factory methods and work standards. *A. W. Morgan* is named general manufacturing manager. He is replaced as works manager of Plant I by *W. L. Young,* former factory manager of division's Plant I.

Gar Wood Industries, Inc.

Mark L. Shepard replaces *J. B. Steed* as manager of Richmond division, Richmond, Calif.

Pabco Products, Inc.

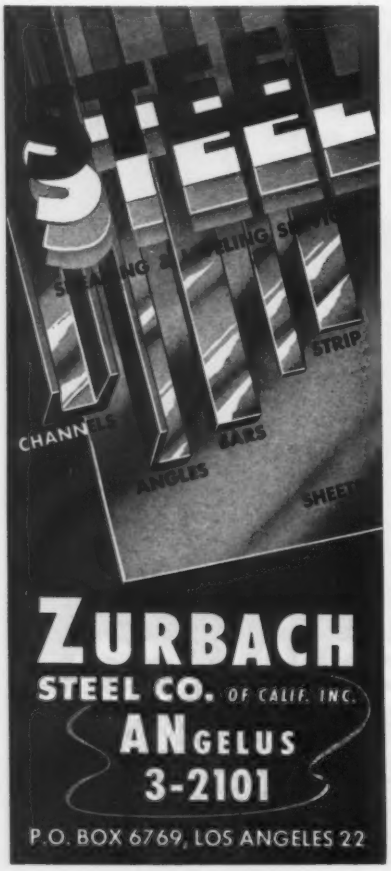
J. F. Havard joins firm as general manager of manufacturing and has been elected a vice president. He was formerly with Potash Company of America. He will be located at Pabco's headquarters office in San Francisco.

Northwest Lead Co.

Wallace D. Miracle, California district manager of this Seattle company, retires.

American Can Co.

William D. Grimmer is named manager of concern's Pacific division closing machine department. Succeeding *F. Joujon-Roche,* who takes over newly created post of manager of manufacture in Canco's closing machine department in New York, Grimmer



will headquarter in San Francisco. *George A. Johannessen* is named agronomist of concern's Pacific division in San Francisco. He replaces *W. C. Hatfield,* recently appointed to Canco sales staff.

Crown Zellerbach Corp.

John R. Segesser joins company's Western waxed paper division as assistant superintendent—technical of plant at San Leandro, Calif. He was formerly associated with California Research Corp., Richmond.

Bulldog Pallet Co.

Roy Sjolund, production manager of this Newark, Calif., firm, becomes general manager and secretary of corporation.

North American Aviation, Inc.

Dr. John P. Howe is appointed chief of Atomic Energy Research department's reactor materials section by North American in Los Angeles. He was recently with General Electric Co. *Dr. Robert L. Loftness* is named group leader of chemical development under Dr. Howe.

Clary Multiplier Corp.

This San Gabriel, Calif., firm names *Paul H. Heinzel* as product design engineer for its Flo-Ball pen division. He comes from Fort Madison, Ia., where he was head of product development for W. A. Sheaffer Pen Co. *Brig. Gen. Merle Halsey Davis,* USA, ret., is appointed manufacturing and engineering consultant for firm's expanded production program. *Paul Meeks* joins Clary as general manager of instrument division, new post set up in expansion of company's guided missile program.

L. H. OPPENHEIM is named vice president of *Henry J. Kaiser Co.* He will continue to serve as assistant general manager of *Kaiser Engineers* division.

FREDRICK G. SUFFIELD becomes assistant to president of *Triad Transformer Corp.,* Venice.

T. T. BLICKLE, mechanical superintendent of *Santa Fe Railway's Coast Lines,* with headquarters in Los Angeles, receives Santiago Brian Memorial Award at Eighth Pan-American Railway Congress, held in Atlantic City, N. J. Award, a sum of about $2,000, was given for his paper "The History, Development, Operation and Performance of Diesel Locomotives on the Santa Fe."

Specification Packaging Engineering Corp., Burbank, names JOSEPH F. POLAND to post of administration executive. Until recently he served with the U. S. Air Force as lieutenant-colonel.

L. L. WILLFONG retires as vice president and plant manager of *Earle M. Jorgensen Co., Forge Division,* Los Angeles, after 56 years in metal-working industry.

RICHARD G. RAY, formerly plant superintendent of *General Controls Co.,* Glendale, advances to post of vice president in charge of manufacturing.

JAMES O. WRIGHT is appointed assistant general purchasing agent, *Ford Division of Ford Motor Co.,* Richmond, and is succeeded by W. A. FOLSOM as assistant general manufacturing manager.

W. S. RHEEM II, formerly regional manager of Richmond plants, is named assistant general manager for *Rheem Manufacturing Co.* E. C. BERGEN steps into Rheem's old post. STEPHEN R. SKROB is promoted from works manager to plant manager at South Gate installation.

Pacific Telephone and Telegraph Co. elects BEN S. GILMER vice president in charge of California operations and JAMES S. CANTLEN vice president and general manager of Southern Calif. area.

BERNARD MARTINSEN, assistant sales manager, is named acting general manager of *Turlock Cooperative Growers,* Modesto, to fill the place vacated by EARL NEEL, on leave of absence because of illness. Neel will continue to hold post of secretary.

R. CURTIS TURNER is elected vice president of *California Packing Corp.,* San Francisco. He will continue duties as manager of company's pineapple interests.

BERT W. REYNOLDS is appointed manager of *Gas Appliance Society of California,* San Francisco. At one time manager of domestic sales of *Pacific Gas and Electric Co.,* Reynolds has been with *General Electric Supply* since 1945.

DAVID H. CLINGMAN retires as president of *Bill Jack Scientific Instruments Co.,* Solana Beach, to be succeeded by CLAYTON G. JACK, former vice president. FERDINAND FLETCHER is appointed secretary and ULYSSES A. PATCHETT, formerly professor of engineering at Stanford University, chief engineer.

KENNETH G. LUNDIE is elected president of *Johnston Pump Co. of New Mexico* and *Johnston Pump Co. of Fresno,* subsidiaries of *Johnston Pump Co. of Pasadena.*

COLORADO

R. L. Manning Co.

John E. Schalk resigns as vice president of firm in order to organize Arapahoe Drilling Co., Denver.

IDAHO

Sidney Mining Co.

Newly elected president of this Coeur d'Alene mining district zinc-lead producer is *Malcolm C. Brown.* Formerly general manager of firm's mining operations, Brown succeeds *W. T. Simons,* resigned.

MONTANA

Montana Power Co.

H. E. Chambliss, formerly Great Falls division manager of company, is promoted to position of chief engineer. He succeeds *A. B. Martin,* resigned to join Washington Water Power Co. as research consultant. Headquarters for Chambliss will be in Butte.

NEVADA

Kennecott Copper Corp.

A. Todd Davis becomes concern's director of training and public relations with full charge of industrial training at McGill and Ruth. His department will also handle public relations program in Reno area. He was formerly assistant director of employee relations.

OREGON

C. D. Johnson Lumber Co.

A. West joins this company at Toledo as superintendent of plywood division. He was

formerly manager for Georgia Pacific Plywood Co., also of Toledo.

Hanna Nickel Smelting Co.

This Riddle, Ore., firm appoints *E. E. Coleman* as its plant manager. He formerly held a similar position with Bradley Mining Co., Stibnite, Idaho.

UTAH

Sure-Seal Corp. of Utah

Louis C. Brown joins Salt Lake City firm as its new manager of operations. He has already taken charge of construction of a wax refining plant in North Salt Lake. Brown formerly was assistant manager of manufacturing, British-American Oil Co., Ltd.

Kennecott Copper Corp.

Charles R. Bird is appointed pension plan administrator, Western mining divisions.

WASHINGTON

Fisher Flouring Mills Co.

This Seattle firm names as vice presidents, *W. L. Haley*, director of products control and production and *A. J. McFarlane*, sales manager of feed division; and as secretary, *E. L. Irvine*, assistant secretary and office manager.

General Electric

At Richland, *Dr. W. I. Patnode* is named manager of firm's salary administration section succeeding *W. P. McCue* who is appointed manager of GE's manufacturing administrative sub-section. McCue replaces *C. A. Priode* who was recently named manager of production section, manufacturing department. *C. N. Gross* assumes post of manager, employee and public relations, and *J. E. Maider* becomes manager of manufacturing. *E. P. Lee*, formerly manager of manufacturing department reactor section at Hanford, is transferred to GE's Knolls Atomic Power Laboratory in Schenectady, New York. Replacing him at Hanford is *J. H. Warren*. Warren is succeeded as reactor section production superintendent by *R. O. Mehann*, formerly superintendent of process sub-section. *A. C. Beltzner* becomes head accountant in company's aircraft nuclear propulsion project at Arco, Idaho. He is replaced at Hanford as community operations and real estate department financial advisor by *C. A. Kremer*, medical department financial advisor.

West Coast Fast Freight, Inc.

Hillis Kindt, Seattle, is appointed to newly established post of vice president in charge of terminal operations. He was formerly associated with firm as consultant on terminal procedures.

ASSOCIATIONS ELECT

American Society of Mechanical Engineers, Southern California section: Chairman, *Frank M. Bayertz*, General Petroleum Corp.; vice chairman, *L. F. Richardson*, Bailey Meter Co.; secretary-treasurer, *R. M. Hatfield*, Combustion Engineering Co.

Pacific Coast Gas Association: President, *W. C. Mainwaring*, vice president and assistant to the president, British Columbia Electric Co., Ltd., Vancouver, B. C.; vice president, *E. D. Sherwin*, president of San Diego Gas and Electric Co.; treasurer, *Harry McGann*, auditor division accounts, Pacific Gas and Electric Co., San Francisco. Manufacturers Section: general chairman, *W. J. Bailey, Jr.*, vice president, Affiliated Gas Equipment, Inc.; general vice chairman, *J. F. Ray*, vice president sales, General Controls Co. Accessories division: chairman, *Howard Dyer*, vice president, Appliance Controls division, Minneapolis-Honeywell Regulator Co.; vice chairman, *George Stevenson*, district manager, American Meter Co. Heating division: chairman, *E. S. Munson*, vice president, Royal Heaters, Inc.; vice chairman (North), *R. R. Taylor*, chief engineer, Fraser & Johnston; vice chairman (South), *P. H. Hammond*, vice president, Holly Manufacturing Co. Gas Range division: chairman, *Gordon Boyle*, sales and advertising manager, O'Keefe and Merritt Co.; vice chairman, *Maurice Breslow*, executive vice president, Gaffers and Sattler division, Utility Appliance Corp. Water heater division: chairman, *R. E. James*, regional sales manager, Rheem Manufacturing Co.; vice chairman, *R. H. Hinckley*, vice president, General Water Heater Corp.

Western TRADE WINDS

News about those who distribute and sell industrial equipment and materials

Triangle Steel appointments

Appointed assistant general manager in charge of operations, Floyd Lewis joins Triangle Steel and Supply Co., Los Angeles, moving there from Booz, Allen & Hamilton, national management consultant firm. Lewis earlier held posts of executive engineer and comptroller at A. J. Smith Engineering Co., Kansas City, Mo.

Triangle also appointed James F. McLaughlin as director of sales and product control, a promotion from his position for past four years as head of fastener and supply division. His new duties, in addition to responsibility for buying, pricing and selling items stocked, numbering over 50,000, include advertising and merchandising programs. Allan Zalk, general manager of Triangle, undertakes more activity in national corporate organization of Zalk-Josephs Co.

Floyd A. Lewis

James A. Holland

Bay State Abrasives representative

James A. Holland transfers to Southern California area from Bay State Abrasive Products Co.'s Detroit branch office. His headquarters will be Republic Supply Co. of California, Los Angeles, which is West Coast distributor for Bay State.

Promoted to industrial agent

G. W. R. McClelland fills post of industrial agent in the joint Southern Pacific-Pacific Electric industrial department, Los Angeles, succeeding C. R. Parker, retired. He has been assistant industrial agent since 1946.

Fresno manager

Edwin K. Ohse becomes manager of Fresno branch of Dallman Co., wholesale plumbing and heating distributor.

Joins Latchford-Marble

Ed Norman joins Latchford-Marble Container & Supply Co., San Francisco, as Northern California representative of this subsidiary of Latchford-Marble Glass Co., Los Angeles.

Shell Chemical promotions

Lawrence F. Stayner is named assistant to manager of Julius Hyman & Co. division of Shell Chemical Corp. at Denver. He has been with Shell since 1938 and was made sales manager of this division when Shell purchased it in 1952. J. J. Lawler, formerly Chicago district manager for Shell, moves to Denver to succeed Stayner as sales manager. He began working for Shell at St. Louis in 1937, upon graduation in chemical engineering from Missouri University. A. P. Howe, senior technical salesman at Chicago, goes to San Francisco as Western division chemical products manager.

Leaves Oakland office

Paul Kluthe transfers from Kaiser Steel Corp.'s central district sales office in Oakland, Calif., to Mid-Continent district, Tulsa, Okla.

Changes at Crown Zellerbach

Arthur L. Fox is named manager of sales promotion and advertising at Crown Zellerbach Corp. headquarters, San Leandro, Calif. He is succeeded as sales manager of Western Waxed Paper division plant, North Portland, Ore., by W. Z. Ritchie. Ritchie was formerly sales representative in Montana, northern Idaho and northern Wyoming. New assistant manager and sales manager of San Leandro plant is Harry W. Huntsman, who transfers from post of sales manager at Los Angeles plant. John J. McCann, formerly sales representative, is named acting sales manager to succeed him.

Moves to West Coast

Edward H. DaCosta is appointed to fill newly created post of Western sales manager of Taylor Fibre Co., with headquarters at company's plant in LaVerne, Calif. He moves to LaVerne from Philadelphia branch sales office, where he has been district manager since 1947. He began employment with Taylor in 1938, with a subsequent four-year absence for service as a pilot with U. S. Air Force. Taylor's LaVerne plant manufactures laminated plastics in sheet, rod and tube form, and fabricates these materials. Home office is Norristown, Pa.

World traveler Hawkesworth

Jim Hawkesworth is appointed district manager of San Francisco branch, Graton & Knight Co., Worcester, Mass., to direct sales operations for their Pacific Coast area, which includes mountain states. Hawkesworth's first association with Graton & Knight, manufacturer of industrial leather products, was in 1913. Originally a production man, he has worked in firm's British branch, directed their belt shop in Shanghai and supervised Canadian sales branch.

New post for Sherman

Gilbert Sherman joins Westinghouse Electric Corp. as electronic tube sales representative in Pacific Coast district, working out of company's Los Angeles office. He succeeds Robert F. Roberts, who moves as manager of equipment tube sales to Westinghouse plant at Elmira, N. Y. Sherman is a graduate in electrical engineering from University of Southern California, 1947. He

was formerly an electronics engineer for Hughes Aircraft and sales engineer for Temco Aircraft.

New Denver manager

C. E. Bennett is promoted to post of manager of Western Gear Works' Denver office. He transfers from Western's Seattle plant, where he was supervisor of production control and purchasing. A licensed professional engineer, Bennett joined Western at Seattle in 1943 and has held positions of planning, project, and sales and service engineer.

C. E. Bennett

Fred F. Welch

Welch heads Hyster store

Fred F. Welch is named general manager of San Francisco retail store of Hyster Co., Portland. He has been with company since 1948, for past two years as manager of Hyster's Seattle store. Robert Golden, who began his service with company at assembly plant in 1936, is appointed sales manager.

Allis-Chalmers appointments

Two new distributors for Allis-Chalmers Manufacturing Co. are named for the West. Jameson Machine Supply, Inc., Lewiston, Idaho, will handle A-C motors and control equipment in Latah, Benewah, Kootenai, Clearwater, Nez Perce, Idaho and Lewis counties in Idaho, and Asotin, Garfield and Whitman counties in Washington. Firm was founded in March of this year by J. C. Jameson. Beaver Electric Co., Corvallis, Ore., is distributor for A-C motors, control equipment and transformers in Benton County, Ore. Ralph L. Koerner and R. E. Sewell are partners in Beaver Electric, organized in 1949.

Peerless choice

Everett W. Lundy becomes assistant sales manager of Peerless Pump division, Food Machinery and Chemical Corp., Los Angeles. His former position of Pacific district manager will be filled by Robert H. Hull, who is now in charge of Peerless' central district at Indianapolis. Lundy has been with Peerless since 1940, when he began as a sales engineer, with subsequent promotions to branch office manager at Phoenix and Pacific district sales manager.

Knapp appoints Froblom

J. B. Froblom is appointed sales engineer for James H. Knapp Co., Los Angeles, and will specialize in atmosphere control furnaces. Froblom has been in field of commercial steel treating since 1934, originally in Chicago. He has lived in Los Angeles since 1945.

Enthone expert

Dave F. Seymour joins technical service staff of Metal Finishing department, L. H. Butcher Co., San Francisco, a subsidiary of the Udylite Corp. Seymour is a chemical engineer, with five years study at University of Minnesota. Background includes both research and service experience with Promat division and as factory manager with Pacific Coast division of Diversey Corp. of Chicago. Seymour will work on sales and service of Enthone products in Western area.

Plexolite bulletins

Fiberglas Engineering and Supply Co. of the Northwest is appointed distributor of Plexolite, translucent building material, by Plexolite Sales Co., Los Angeles. Fiberglas Co. has warehouses in Seattle, Spokane and Anchorage and another sales office in Yakima. New sales promotion manager for Plexolite is Reed Myers, who will work with Plexolite dealers on point-of-sale merchandising. Company will complete new Los Angeles plant in October, quadrupling production of Fiberglas-plastic panel.

Pacific Metals

The Pacific Metals Company, Ltd., San Francisco, adds complete line of Westinghouse welding equipment, electrodes and supplies. Firm's territory covers California, Nevada, Utah, Arizona and southern Idaho, with district offices at Los Angeles, San Francisco, Phoenix, Salt Lake City and San Diego. Companies represented by 23-year-old firm include Alcoa, Revere, Crucible Steel and International Nickel.

Expand West Coast services

Hanson-Van Winkle-Munning Co., Matawan, N. J., manufacturer of electroplating and polishing equipment and supplies, assigns Harold R. Smallman, assistant vice president, supervision of all its West Coast busi-

ness, with offices in Los Angeles. He will work with A. J. Lynch Co., newly-appointed California distributor for manufacturing firm. Lynch has headquarters in Los Angeles and additional warehouse and sales facilities in San Francisco. Smallman transfers from Chicago, where he has been district manager for 23 of his 31 years of service with H-VW-M.

To work in Vernon

M. E. Canfield Co., Los Angeles distributor of materials handling equipment, appoints H. E. Fritz as new salesman in Vernon industrial area.

Wooldridge adds new line

W. P. Wooldridge Co. of San Francisco, with branch offices in Los Angeles and Salt Lake City, is appointed Western sales representative for George J. Hagan Co., of Pittsburgh, Pa., manufacturer of industrial furnaces. Wooldridge Co., which has been on Pacific Coast since 1932, was formerly associated with Columbia-Geneva Steel division of U. S. Steel Corp., Pacific States Steel Corp. and Kaiser Steel in sales engineering capacity.

Leadership training

Northwest Personnel Services, Inc., Portland, names J. A. Wood as its president. Wood was formerly manager of training for Hanford, Wash., plutonium plant and before that training director for eastern plants of DuPont. Northwest is offering new personnel development services, among them a 40-hour leadership training program tailored to needs of individual firm. Discussion meetings will be conducted at plants served or at Northwest's conference rooms located in several cities. New activities are an addition to firm's personnel selection and placement service.

Standard sales engineer

Sepp Benedikter joins sales engineering staff of Standard Conveyor Co., Los Angeles. Known for his work in design and construction of cable chair lifts for skiing, Benedikter will continue in this work as well as handle Standard's full line of roller and belt conveyors, spiral chutes and pneumatic tube systems.

New Westerner

E. J. Stein, sales engineer, Allegheny Ludlum Steel Corp., transfers to that company's Los Angeles sales office from Dayton, Ohio, his headquarters for the past four years. Stein began working for Allegheny Ludlum at its Brackenridge mill and was assigned to Chicago office prior to joining Dayton sales force. In his new assignment he will work out of Allegheny's Los Angeles plant and specialize in sale of stainless and electrical steels.

Ampex sales reorganization

Ampex Corp. appoints Russell J. Tinkham manager of audio sales, with headquarters at firm's plant in Redwood City, Calif. He transfers from post of manager of Ampex's midwestern sales district, Chicago. E. G. Swanson is named to head new southwestern sales district, which includes Southern California, Arizona and New Mexico. Sales office for Northern California and other Western states will continue to be in San Francisco.

Los Angeles transfer

William C. Vanbebber is appointed sales engineer for Baldwin testing equipment in Los Angeles and surrounding territory by Baldwin-Lima-Hamilton Corp., Philadelphia. He was formerly supervisor of renewal parts for Baldwin diesel locomotives in Pacific Coast district at San Francisco, and has been with the company since 1948.

Fiberglas expands

Fiberglas Engineering and Supply Co., division of Owens-Corning Fiberglas Co., opens larger warehouse and office facilities at 1200 Seventeenth St., San Francisco. Over 100,000 sq. ft. of warehouse space is available for enlarged stocks of thermal and acoustical insulation, and plumbing, heating and air conditioning supplies.

Permalune distributor

Bohalco, Inc., Los Angeles, is appointed exclusive Southern California distributor of Permalune liquid foil protective coatings by their manufacturer, Grems Mfg. Co., Klamath Falls, Ore. Territory to be served by Bohalco is Southern California, Arizona and Clark County, Nev.

Ulrich joins General Paint

F. S. Ulrich is appointed vice president in charge of industrial sales, General Paint Corp., San Francisco. He leaves Sherwin-Williams Co., with whom he has been associated for 24 years, for the past 11 of them in supervising firm's industrial business on Pacific Coast.

New office for Enterprise

Enterprise division, General Metals Corp., sets up new office for Denver and Rocky Mountain area, headed by Percy Griffin. Service will emphasize oil field applications of Enterprise engines. H. T. Anderson, formerly in New York branch office, returns to San Francisco as assistant general sales manager.

Pick Western distributor

A. L. Watson Co., Milton, Mass., appoints COQUIPCO, Los Angeles, as Western distributor of TMCO automatic grease lubricators. Stocks of new lubricator, a self-feeding pressure grease cup, are now maintained in Los Angeles and San Francisco and will later be added at other locations.

New Flexible Steel man

John A. Marshall is appointed representative for Flexible Steel Lacing Co. in Oregon and Washington. Company manufactures belt fasteners for joining conveyor and transmission belts. Marshall has worked with supply houses in this area for past five years.

Earle moves to Annin Co.

Henry C. Earle, Jr., joins The Annin Co., Los Angeles manufacturer of control valves, as sales manager. For past six years he has been Los Angeles district manager for another company in this field and has a grand total of twenty years' experience in instrument and control valve business.

Kyle adds Skil tools

New line of saws, drills and other contractors' tools manufactured by Skil Corp., Inc., Chicago, is added to products handled by Kyle & Company. Kyle has plants and offices in Fresno, Stockton and Sacramento and is a distributor of steel products and other industrial supplies.

Supervisors named

The DeVilbiss Co., Toledo, Ohio, appoints J. W. Dayton to post of West Coast district sales supervisor and L. C. Buckmaster, Santa Clara branch supervisor.

Atkomatic Valve representative

Herman E. Held, San Francisco, is selected as Northern California representative for Atkomatic Valve Co., Indianapolis, Ind., manufacturer of electrically operated valves.

Joins firm

Lyle D. Robar is appointed purchasing agent for Supreme Lighting Co., Los Angeles.

CLASSIFIED SECTION

Space is sold as advertisers' inches. All advertisements in this section are ⅛ inch short of contracted space to allow for borders and composition. Rates are $7.50 a column inch. Copy should be sent in by the 25th of preceding month if proofs are required; by the 28th if no proofs are required.

NEW PRODUCT

PHOTOCOPIES
in 1 MINUTE at your desk—on the
DUPLOMAT-ULTRA

low priced—all electric, fully automatic Photocopying Machine. Exposing, developing and transferring in ONE UNIT. Photolike duplicates up to 14½" width, any length.

THE DUPLOMAT COMPANY
126 Post Street YU 6-5941 San Francisco, Calif.

POSITION WANTED

TRAFFIC MAN

available as traffic manager or assistant or in other work in which knowledge of rate structure, traffic movement, transportation operations and executive level traffic management is important.

Rail, forwarder and shipper experience as chief rate clerk, yardmaster, warehouse manager, rate and classification analyst; member freight classification committee; 6 years section chief, Interstate Commerce Commission.

Knows rates, transit, claims, rate negotiation. Qualified office manager. Some knowledge bookkeeping, accounting, taxes.

WRITE OR WIRE: BOX 901
WESTERN INDUSTRY
609 Mission Street, San Francisco 5, Calif.

HELP WANTED

MASTER MAINTENANCE MECHANIC

Desired by a leading fruit processing association in the Mid-Columbia Area of Oregon to take complete charge of cannery maintenance, repair, and mechanical construction work.

It is desirable that the applicant have supervisory experience in maintenance and repair of cannery processing equipment. He must have some knowledge of machine design, materials, layout, and cost estimating.

Permanent position with advancement in authority and salary for the man with the desired ability. Salary open. Give full qualifications and references first letter.

BOX 1001, WESTERN INDUSTRY
609 Mission St., San Francisco 5, Calif.

Call King TU-3176 | MATERIAL HANDLING EQUIPMENT

Lift Trucks • Hand Trucks • Conveyors Hoists & Cranes Casters & Wheels

IRVING G. KING & CO. ★ SINCE 1930
821 MATEO ST. L. A. 21

ANODIZING FACILITIES

Full finishing service for aluminum products. Clear Anodize; R-5 Bright Dip; Color Anodizing; Government Specifications; Frankford Arsenal Spec. No. FXS-963 Type B Class 1, 2, & 3.

ALSO DICHOMATE SEALING:

Prompt Service from
W. F. HEINE SUPPLY CO.
6015 Adeline St. Oakland 8, Calif.
OLympic 3-5500

PLATE ROLLS

Complete with 2 top rolls, 16" in. diam. and 10½" diam. Can roll ¾" plate, 16' long to 24" diam. 50-hp. motor included. Mr. Hall

PACIFIC COAST ENGINEERING CO.
LA 2-6100 Alameda, Calif.

BUDA INDUSTRIAL DIESEL POWER UNIT

Model DC-844. This engine is in excellent condition, complete with radiator, twin disc clutch, starting motor, generator, air cleaner. Skid mounted. Ready to start work. Only $1950.

FREIGHTLINER CORP.
1925 NW Quimby, Portland, Ore. BR. 5511
Teletype PD-355

READ & USE
WESTERN INDUSTRY
CLASSIFIED ADS

100 GENUINE 8 x 10 PHOTOS **10¢** ea

24 HOUR SERVICE!

FREE DELIVERY ANYWHERE

MADE DIRECT FROM PHOTOS (OR NEGATIVES) • 50 8 x 10 13c ea 500 8 x 10 8c ea

1000 8 x 10 GLOSSIES **7¢** EACH

POSTCARDS

5000 $21 PER M **2½¢** EA

SAVE THROUGH QUANTITY PRODUCTION

FOR COMPLETE PRICE INFORMATION WRITE OR PHONE

QUANTITY PHOTOS, Inc.
HOllywood 7-6179
5509 SUNSET BLVD., HOLLYWOOD 28, CALIF.
LARGEST PHOTO REPRODUCTION PLANT IN WEST

Pipe Repair CLAMPS

Made for every type of leak—any temperature or pressure. Send for Catalog No. 41-O.

M. B. SKINNER CO., SOUTH BEND 21, INDIANA

Want Ad Order Blank

Please run my ad 12, 6, 1 time (circle which) at the rate of $7.50 a column inch. Make ad 1, 2, 3 columns wide (circle which) by ..... inches (specify, one to 10) deep.

Signed .....

Address .....

City..... State.....

WRITE AD HERE:

.....

.....

.....

.....

.....

.....

.....

.....

Send ad to Classified Dept.,
WESTERN INDUSTRY, 609 Mission St., San Francisco 5, Calif.

INDEX TO ADVERTISERS IN THIS ISSUE

Western Industry

COMING UP!

Sixth Annual
Review & Forecast Number
January 1954

UNIQUE GUIDEBOOK

The Facts YOU NEED

AND CAN USE

About the industrial West. Its progress, its prospects, its markets for your products and services. That is the special function of this issue. The overall picture, plus 63 of its industries analyzed for output, trends, materials, equipment, methods

Your part in it? Turn the page . .

GET YOURSELF ON RECORD . . .

Identify yourself as indispensable and important in the Western development picture.

Tell them you have what they need. Get rightful recognition in the West's industrial expansion.

Convince them by telling the story of your outstanding contributions to the West's progress.

Project yourself into the Western picture. Use the Review & Forecast Number.

Widely Read

The Review and Forecast is the only guidebook of Western industrial trends and developments.

Widely Recognized

More than 60 industries reviewed: output, market conditions, processes, equipment, materials.

Unique Guidebook

Mailed to 10,000 men with buying power and influence in the West. Proven readership of over 55,000.

Phone, write or come to

Western Industry

609 MISSION STREET • SAN FRANCISCO 5, CALIF.
YUKON 2-4343

Or consult our nearest District Manager

SAN FRANCISCO OFFICE
V. C. Dowdle, District Mgr.
609 Mission St., San Francisco 5
Telephone YUkon 2-4343

LOS ANGELES OFFICE
Jerome E. Badgley, District Mgr.
128 S. Mansfield Ave., Los Angeles 36
Telephone WEbster 8-8512

PACIFIC NORTHWEST
Arthur J. Urbain, District Mgr.
609 Mission St., San Francisco 5
Telephone YUkon 2-4343

NEW YORK OFFICE
Richard J. Murphy, Eastern Mgr.
107-51 131st Street
Richmond Hill 19, New York
Telephone Jamaica 9-2651

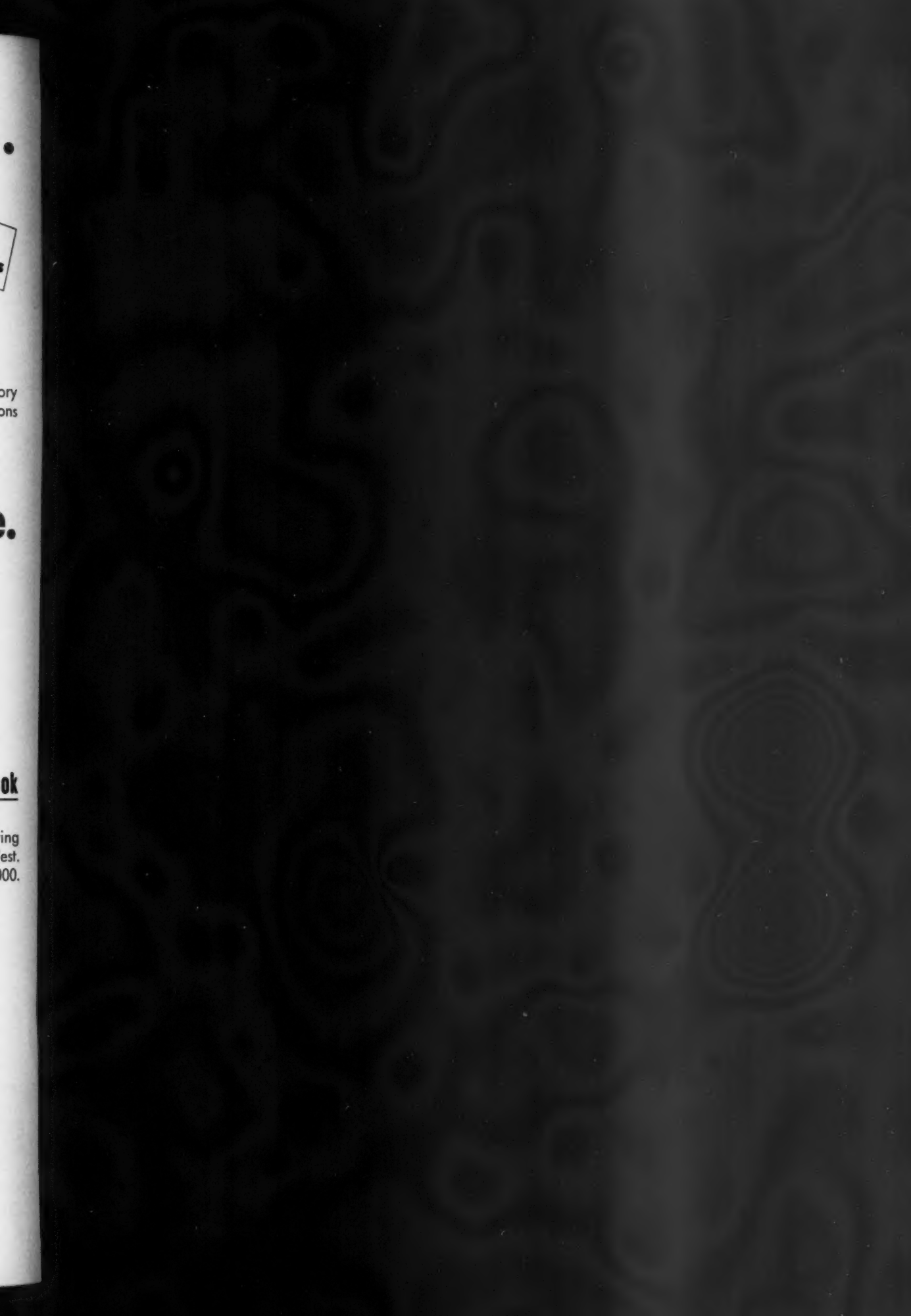
CLEVELAND OFFICE
Clifford E. Beavan, District Mgr.
3307 E. 149th St., Cleveland 20, Ohio
Telephone SKyline 1-6552

CHICAGO OFFICE
A. C. Petersen, District Mgr.
3423 Prairie Ave., Brookfield, Ill.
Telephone Brookfield 532

To be published as the January 1954 issue.

REGULAR RATES APPLY:

One page	$280.00
⅔ page	186.67
½ page	140.00
⅓ page	93.33
¼ page	70.00



THE West ON ITS WAY

NEW PLANTS, EXPANSIONS, NEW INDUSTRIES, PRODUCTION CONTRACTS, DEVELOPMENT PROJECTS, UTILIZATION OF RESOURCES

MORE POPULATION CREATES MORE JOBS

Executives, technicians, craftsmen needed for the West

ANOTHER of the interesting economic studies of Western conditions that the National Association of Manufacturers has been releasing is being used on this page this month because it shows what a pool of skilled craftsmen and technical and professional people will be required to meet the needs of increased population and expanded industry.

The accompanying chart and figures indicate the situation clearly. While some people may feel apprehensive at the huge number of jobs that must be provided, other more farseeing observers recognize that industry follows population and that the job situation will pretty much take care of itself.

One of the hindrances to industrial development in the West in times past has been the lack of skilled craftsmen in various lines. The job opportunities calculated by the NAM indicate that this lack will be progressively overcome.

* * *

Average annual sales of machinery, equipment and supplies by wholesalers in 1948 on the Pacific Coast were considerably above the rest of the country, according to a Census of Manufactures analysis presented by Dr. Nathanael H. Engle, director of the Bureau of Business Research, University of Washington, at a symposium in connection with the Star Machinery Company show in Seattle late in September.

These are the latest figures obtainable, and they show the Pacific Coast as having 1,623 establishments with average sales of $500,000, and the United States with 21,430 with an average of $300,000.

Independent wholesalers, or industrial distributors, for the country as a whole led manufacturers' sales branches in a ratio of three to two, according to Dr. Engle's analysis. On the Pacific Coast the ratio was about two to one, or comparative sales of $800,000,000 and $400,000,000 respectively.

* * *

In a few years the Western market will have a television tube replacement business of approximately one million annually, in view of a TV set saturation of 4,000,000, according to a study recently completed by Pioneer Electronics Corp. of Santa Monica, California. Laurence M. Parrish, president, says that a six-year study of the replacement market shows the life of the average picture tube is in excess of two years, which means, conservatively speaking, a 4,000,000 tube replacement market every two to four years.

OCCUPATIONAL OPPORTUNITIES in 11 Western States

(As estimated by the NAM from 1950 U. S. Census figures)

Professional

1950	754,000
Est. Increase	419,000
Total by 1960	1,173,000

Managers

1950	783,500
Est. Increase	328,000
Total by 1960	1,111,500

Clerical

1950	948,000
Est. Increase	564,000
Total by 1960	1,512,000

Sales Workers

1950	589,000
Est. Increase	254,500
Total by 1960	843,500

Craftsmen

1950	1,117,000
Est. Increase	650,000
Total by 1960	1,767,000

Operatives

1950	1,143,500
Est. Increase	416,500†
Total by 1960	1,555,500

Private Household

1950	149,500
Est. Decrease	-65,000
Total by 1960	84,500

Service

1950	568,000
Est. Increase	168,000‡
Total by 1960	734,000

Laborers

1950	521,500
Est. Increase	101,500*
Total by 1960	610,000

*Idaho did not report and Washington estimated 13,000 decrease.

†Montana reported decrease of 1,000; Nevada, decrease of 3,500.

‡Wyoming reported decrease of 2,000.

A section of the October 1953 issue of WESTERN INDUSTRY—609 Mission Street, San Francisco 5, Calif.

NEW PLANT—New plant of Cal-Tronics Corp., Los Angeles, contains 20,000 sq. ft. of floor space, of which 3,500 sq ft. is used for engineering. Company designs and manufactures electronic production testing equipment, employing 65 at present time.

ARIZONA

NEW FOUNDRY—Capitol Foundry, south of Tempe, starts production of iron balls used in grinding copper ore for flotation processing, with capacity of 2,000 tons per month. Full development of 86-acre plant site calls for total expenditure of $3,500,000, with future payroll over $1,500,000 annually.

TO STUDY MINING TOWN—University of Arizona's Bureau of Business Research undertakes special survey of Ajo, town in which Phelps Dodge Corp.'s New Cornelia Branch copper facilities are located. Purpose is to determine impact of a single primary industry on a community and relationship of that community to entire state. John Leonard, graduate student, is making survey under Dr. W. L. Casady, director of Bureau of Business Research.

CALIFORNIA

"AIRLIFT" ENDS—Contract of United Air Lines with Military Air Transport Service for flying troops and supplies to Tokyo is terminated. In 39 months under this contract, United completed about 1,000 round trips between San Francisco and Tokyo, carrying over 25,000 troops as well as mail, military freight and medical supplies. Four DC-4's in military use will be reconverted and personnel returned to commercial operations.

NEW AIR FORCE CONTRACTS — Lockheed Aircraft Corp., Burbank, receives Air Force contract to build prototypes of XF-104, air superiority fighter. A piloted jet airplane, this fighter is designed to establish air superiority in a given area by sweeping skies of enemy planes. Lockheed also is conducting a preliminary design study on nuclear-powered aircraft under an Air Force contract.

START PARALLEL PIPELINE—Contract for building 73 miles of pipeline is awarded by Southern California and Southern Counties Gas Cos., Los Angeles, to River Construction Co. of Fort Worth, Tex. New 30-in. loop pipeline, which will parallel original "Biggest Inch" line, is expected to cost $5,300,000 and to be in operation by February 1954. Its construction is part of $210,000,000 expansion of natural gas artery supplying California markets which was approved in July by Federal Power Commission. Participants in construction program are two Southern Calif. gas companies, which will spend $7,500,000; Pacific Gas & Electric Co., $26,700,000; and El Paso Natural Gas Co., $175,000,000. Loop pipelines and compressor plant additions will permit delivery of additional 300,000,000 cu. ft. of natural gas daily to California, to be divided equally between Southern and Northern California.

REFINERY PLANS REFINED—Refinery improvements, to cost $4,000,000, planned by Hancock Oil Co. of California will include a Thermofor catalytic cracking unit with 4,200 bbl. per day capacity and 350 bbl. per day polymerization plant. Company will invite bids soon, with construction expected to take about one year.

SILICA BRICK ADDED—Warm Springs Works of Harbison-Walker Refractories Co. adds to its operations production of Vega super-duty silica brick. Materials from company's mining operations on West Coast will be used in manufacturing silica refractory. Harbison-Walker has main offices in Pittsburgh, Pa.

NEW WEST COAST PLANT — Certified Alloys Co. of Bedford, Ohio, opens new alloying plant in Los Angeles to supply zinc ingots to users on the West Coast. In charge of plant operations is John Sellon, who prior to this assignment headed Zinc Division of National Production Authority, Washington, D.C.

CERTIFICATES OF NECESSITY—Office of Defense Mobilization issues certificates of necessity for following defense-connected industrial projects: Tide Water Associated Oil Co., Avon, $875,000 and $425,000 for petroleum refining facilities; Terminal District Co., San Francisco, $995,000 for public storage; Harbor Tug and Barge Co., San Francisco, $100,000 for inland waterway transportation.

SAFEWAY PURCHASE — Properties and trade name of Tea Garden Products Co., San Francisco, producer of juices, preserves and syrups, are to be purchased by Safeway Stores, Inc., under recent agreement approved by Tea Garden stockholders. Tea Garden-owned plants in Grandview, Wash., and Beaverton, Ore., and leased plant at San Leandro, Calif., are covered by agreement. Present operating personnel and procedures of purchased firm will be continued. Safeway has in past years bought a substantial part of Tea Garden's output.

PURCHASE OFFER — McCormick & Co., Inc., Baltimore, will offer to buy outstanding stock of Ben-Hur Products, Inc., Los Angeles, processor of spices, extracts, puddings and coffee. Merger requires approval of stockholders of both companies and California Corporation Commission. McCormick, a spice

PLANT AREA SWELLS—National Welding Equipment Co., Los Angeles, adds over 16,000 sq. ft. of floor space through purchase of buildings and parking area adjacent to present facilities, shown here. About 10,000 sq. ft. will be added to shop, and the remainder to engineering and development departments, storage and display. Company states it needs increased area for expanding production in medical equipment division and a new operation of high pressure equipment.

Every 3 days a new diesel joins the Santa Fe fleet!

A 10-year record of "building new" on the Santa Fe

Christened with California champagne, Santa Fe's first multiple-unit diesel locomotive rolled out of Chicago on Tuesday, May 12, 1936.

It powered the first *Super Chief*.

39¾ hours later it rolled into Los Angeles—and the new age in railroading was born.

There were 3600 "horses" in that one.

Five years later, the first multiple-unit freight diesel rolled on Santa Fe rails.

There were 5400 "horses" in that one.

Today, there is more than 2,100,000 diesel horsepower on the Santa Fe—1524 mighty diesel units.

From 1943 through 1952, a total of 1261 diesel units were placed in service. *Better than one every 3 days for a 10-year record!*

And still they come! 222 in 1953!

Every diesel added, every mile of heavier rail, makes America's New Railroad a little more *completely* new. Why, enough new rail has been laid on the Santa Fe in the last seven years alone *to reach from Chicago to Los Angeles!*

All new—but always the old pride that all this building new costs you, the taxpayer, not one tax penny.

SANTA FE SYSTEM LINES

Santa Fe

PROGRESS THAT PAYS ITS OWN WAY

and extract firm, now operates as one of its divisions A. Schilling & Co., San Francisco, acquired in 1947.

MORE SPACE—North American Aviation, Inc., leases 126,000 sq. ft. plant in Los Angeles for its fuselage assembly departments working on F-100 Super Sabrejets. Construction of $1,000,000 plant was to be completed about Oct. 15. Facilities cover 8½ acres and include 150,000 sq. ft. of paved yard.

FOAM RUBBER PLANT—Construction starts on 66,000 sq. ft. plant for U. S. Rubber Co. on a 55-acre site in Santa Ana, which will be completed next February. Plant, to employ about 150 persons at start, will be company's first foam rubber factory on West Coast. U. S. Rubber has tire plant and small chemical plant in Los Angeles.

CONSOLIDATE — Highland Laboratories, Los Angeles, consolidates operations of its four plants by moving into 88,000 sq. ft. building newly remodeled for firm's drug and biological manufacturing. Cost of property and new equipment totals nearly $1,000,000. Production capacity now is said to triple that of former leased properties.

PLAN GRASS VALLEY MOVE—Litton Engineering Laboratories, San Carlos, plans unit-by-unit move to Grass Valley, Nevada County, to begin in about a year. Firm will buy partially completed Grass Valley Memorial Hospital and 156 acres of land for $135,000 and remodel building at a cost of about $250,000. Laboratories, which employ about 60 persons, develop and produce equipment for electronics plants. Litton Industries, also headed by Charles Litton, a microwave vacuum tube manufacturing firm, will remain in San Carlos.

NO JET HELICOPTER—Air Force, in economy move, cancels contract with Hughes Aircraft Co. for development of XH-17, a cargo-carrying jet-powered helicopter, called "flying crane." Chief helicopter engineer Nicholas Stefano has left Hughes to join American Helicopter Co., Inc., of Manhattan Beach, Calif.

MERGER—Kaye-Halbert Corp., Culver City, manufacturer of television sets, plans to acquire all facilities of Pacific Instrument and Control Co., Los Angeles, producer of precision equipment for aircraft and industrial use. Pacific Instrument will be operated as a subsidiary under present head and founder Samuel Aronoff.

BACK TO THE LAND—Sierra Talc and Clay Co. transfers mill from Randolph St. location in Los Angeles to Olancha, 200 mi. north of Los Angeles and only 7 mi. from talc and clay mine it will serve. Los Angeles property was sold to the State to be used in construction of Long Beach freeway. Mill will have reopened by mid-October.

TO BOOST PLYWOOD OUTPUT — U. S. Plywood Corp. plans construction of $2,000,000 plant at its Novoply division, in Shasta County, which will increase output by about 65%. Production plant is more than half completed, foundation for new sawmill has been laid, resin plant is in design stage, and plans also call for new power plant. Payroll is expected to increase from present 900 to 1,000 by spring. Novoply process using second-growth timber, waste and chips was developed in Switzerland.

FIRE DESTROYS PLANT—Five buildings of Pacific Railway Signal Co. in Los Gatos are destroyed by fire, which stopped short of outer storage buildings containing high explosives. Company manufactures railroad signal flares.

$100,000 FIRE—Pacific Bronze Company plant at Los Angeles burns, fed by lacquer and paint thinner stocks. Loss is estimated at nearly $100,000.

PIONEER OPENS PLANT—New 30,000 sq. ft. plant of Pioneer Electronics Corp., West Los Angeles, starts production, with schedule of over 1,500 television picture tubes per week. Cost of construction of plant exceeded $200,000, and cost of new equipment an additional $250,000.

CHANGE OF ADDRESS — Jervis B. Webb Co. of California, engineers and manufacturers of conveyors, moves offices and factory to larger quarters at 9301 Rayo Avenue, South Gate.

NEW ELECTRONICS FIRM — Ramo-Wooldridge Corp., Los Angeles, is formed for research, development and manufacturing in field of advanced electronics and guided missiles. Thompson Products, Inc., Cleveland, Ohio, has stock interest in new company, which is headed by Dean E. Wooldridge, for past two years vice president in charge of re-

search and development for Hughes Aircraft Co. Vice president and executive director is Simon Ramo, former vice president for operations at Hughes. Company plans to acquire laboratory and manufacturing facilities in Los Angeles.

DOUBLE CHINA OUTPUT—Gladding, McBean & Co. begins construction of new plant in Los Angeles which will double capacity for making its Franciscan line of china. Plant is to be completed January 1, 1954, with installation of machinery soon after. Company also announces purchase of land, buildings and all facilities of Angeleno Tile Co., Redondo Beach, a modern, four year old facility which will give Gladding, McBean additional glazed tile capacity.

BUYS MODESTO REFRIGERATING CO. — Merchants Refrigerating Company, N. Y., purchases Modesto Refrigerating Co., Modesto for $1,750,000.

PACIFIC CAN TO BUILD—Pacific Can Co., San Francisco, completes negotiations to buy 15-acre site in Los Angeles for construction of new $2,000,000 plant. Present Los Angeles plant will be sold. New building, with estimated completion date in July 1954, will have daily capacity of 6,000,000 cans, which represents a doubling of company's over-all capacity. Design will provide 250,000 sq. ft. of floor space on one level. Payroll for 1,000 employees, planned initial strength, is estimated at $3,900,000 annually.

CONTRACTS AND PLANS — Union Oil Co. of Calif. awards contracts on first unit of its construction program at Oleum. C. F. Braun & Co. will build "platformer," a catalytic reforming unit, licensed by Universal Oil Products Co., to be completed by November 1954. Contract with Bechtel Corp. covers construction of outside facilities, utilities and tankage required for platformer, which will have daily feed capacity of 14,500 bbl. of gasoline. Engineering studies are still in progress on remainder of $40,000,000 construction program: catalytic desuphurization unit, coker, sulphur removal unit and processing unit, gasoline finishing unit and auxiliary facilities.

Union Oil also plans $600,000 project at its Cut Bank, Mont., refinery. Construction of 600-bbl.-per-day catalytic reformer and auxiliary facilities will begin in spring by Ralph M. Parsons Co. of Los Angeles, to be completed by September 1954.

COLORADO

RESURRECTION MINING — Newmont Mining Corp., formerly one-third owner of Resurrection Mining Co., Leadville, buys remaining two one-third interests, to become owner of entire property. Purchase price of $500,000 was paid to Hecla Mining Co. and also to United States Smelting Refining and Mining Co. Resurrection property recently closed down operations because of declining lead and zinc prices.

ATOMIC PLANT FINISHED — Rocky Flats production plant, under Santa Fe operations office of Atomic Energy Commission, which is concerned with research, development, testing and production of atomic weapons, nears completion. Cost of construction totals about $43,739,000, which is under the original estimate of $45,000,000 made when work started in June 1951. Main contractor was Austin Co. of Cleveland, Ohio, with work totaling $34,500,000. It is known that 19 contracts with 17 construction firms were let. At its peak, construction operations employed over 2,500 workers.

REVIVE GHOST TOWN—Marble deposits at Marble are purchased from Colorado-Yule Marble Co. by a newly formed corporation headed by Allyn Cole, Glenwood Springs, Robert Bosworth, Denver, and Carl Norris, a Missouri-Illinois limestone operator. Quarries, which furnished marble for public buildings throughout the country from about 1870 to 1940, will be used for production of lime. First kiln will be built on site of old mill next spring and will employ 20 to 30 persons.

RESOURCES CONFERENCE — Westerners serving on nine-man steering committee on water resources for conference to be held in Washington, D. C., this December, under auspices of Resources for the Future, Inc., a nonprofit corporation, are: Jean S. Breitenstein, president of Denver Law Club; Gen. Warren T. Hannum, retired chairman of water pollution control board of Calif.; Samuel B. Morris, chief engineer and general manager of the De-

partment of Water and Power of Los Angeles; and Charles S. Sprague, editor and publisher of Oregon Statesman and former governor of Oregon.

CLOSE COAL MINE — Colorado Fuel and Iron Co. plans to close its Kebler coal mine and Tioga townsite in southern Colorado, as a result of falling off in requirements for domestic, commercial and railroad engine coal.

GAS FLARING STOPS—Colorado Oil and Gas Conservation Commission order halts burning of waste natural gas at Rangely Field and requires that operators inject gas back into field to repressurize reservoir. It is expected that 52,000,000 cu. ft. daily of dry gas will be returned to field through seven input wells. System will prolong life of field and result in long-run recovery of estimated additional 80,000,000 bbl. of oil.

PLANS FOR LITTLE BEAVER—R. A. Goodall, Nebraska manufacturer and oil operator, plans to build $1,000,000 gasoline plant in Little Beaver oil field near Brush, Colo. Goodall, who owns 40% of 63 producing wells in Little Beaver field, is negotiating with Continental and Lion Oil Cos. for their participation in gasoline plant. Goodall has recently been granted approval to construct $1,100,000 pipeline from this field to terminus near Merino, Colo., and will be joined in this project by Sinclair Pipeline Co. Line, to have capacity between 12,000 and 18,000 bbl. of crude oil daily, is already under construction.

IDAHO

SAWMILL BURNS — Plans are underway to rebuild Ida-ine Lumber Co. sawmill at White Bird, which was destroyed by fire with loss estimated at $375,000.

SILVER BUCKLE EXPLORATION — Vindicator Silver-Lead Mining Co. enters agreement with Silver Buckle Mining Co. for development of Vindicator property near Mullan. Silver Buckle will sink 800-ft. shaft for exploration work, and supply matching funds to those loaned by Defense Minerals Exploration Admin., in return for half interest in all ore and minerals found.

NEVADA

NEW MILL AT GABBS—Toiyabe Mining & Milling Co. is formed by J. H. Baxter and R. R. Reed to build and operate 50-ton tungsten processing mill at Gabbs. Company will process ore from tungsten deposit 20 mi. south of Gabbs, which has shipped 3,000 tons of scheelite ore in past eight months.

WAREHOUSE BOOM—Walter H. Sullivan and Sons, San Francisco property development firm, buys 50-acre property from C. J. Christensen in Sparks for warehouse development. Firm plans to construct between 800,000 and 1,000,000 sq. ft. of buildings, with a total investment in both land and structures of over $4,000,000. Reinforced concrete buildings, tailored to tenant's specifications, will be made available on long-term lease to Eastern manufacturers who wish to stockpile products for West Coast markets under Nevada's "free port" law. Warehouse facilities are reportedly under construction also at Arden, supported by a group of Las Vegas businessmen.

BLUE DIAMOND GROWS—Expansion program, to cost $2,000,000, is in progress for Blue Diamond Corp. to expand its gypsum mining and processing facilities in Southern Nevada from 900 to 1,300 tons per day.

NEW MEXICO

TV IN RATON—Pilot run of 50 television cabinets is successfully completed by new firm, Raton Manufacturing & Development Co., headed by Paul Arthur. Cabinets will house sets to be made by A. R. F. Products in its recently completed plant at Raton. Production goal set by two cooperating companies is at least 1,000 cabinets.

SELL TO EL PASO—Beaver Lodge Oil Corp., Dallas, Tex., sells fractional interests in its San Juan gas properties to El Paso Natural Gas Co., at purchase price of approximately $1,000,000. Agreement involves about 4,000 acres of leases in Cedar Hill and nearby areas of Blanco field. Beaver Lodge retains all oil rights and deep gas rights and reserves an over-riding royalty on all gas produced from its properties, as well as all liquid hydrocarbons produced with gas. El Paso receives gas rights in Mesaverde (shallow) formation and option to explore for deep gas. Additional wells will be sold to El Paso as completed on Beaver Lodge leases at price of $85,000 for each 100% interest well.

OREGON

REYNOLDS RECONNOITERS — Reynolds Aluminum Co. reportedly is interested in area near Umatilla, below McNary dam on the Columbia River, as possible location for a Northwest fabricating plant. Company is negotiating with Bonneville administration on a firm power commitment.

SP ACTION — Southern Pacific Co. authorizes $3,803,000 project for centralized traffic control on 95 mi. of track between Crescent Lake and Eugene, to increase freight capacity. Control panel in dispatcher's office at Eugene will set signals and line up switches for trains on entire stretch of track; running time will be reduced and more trains handled. Work on a 99-mi. CTC system between Klamath Falls and Crescent Lake is near completion at a cost of $2,461,000. With Crescent Lake-Eugene segment, 273 mi. of SP's Cascade line will be under CTC.

LOW BIDDERS—Tongue Point Naval Station awards $185,809 contract to overhaul seven amphibious naval craft to Albina Engine & Machine Works, Inc., Portland. Pacific Machine and Blacksmith Co. of Astoria received contract for overhauling four other vessels, with a bid of $102,344. Work is part of routine rotation overhaul.

NEW SEATTLE PLANT—Star Machinery Co.'s new building at 241 Lander St., Seattle, a machinery distribution and service facility. From left to right: customer and employee parking area, general and sales offices, main entrance, and display window of 120 x 160-ft. sales floor.

UTAH

BUILD WAX PLANT — Construction begins on new $2,000,000 plant of Sure-Seal Corp. at Bountiful, near Salt Lake City. Plant will use initially about 500 bbl. daily of Uintah Basin crude oil with anticipated expansion of capacity within five years to 5,000 bbl. per day.

GARRETT TERMINAL—Horman Construction Co. begins work on Garrett Freight Lines, Inc., $600,000 terminal in Salt Lake City. Facilities to be built on 22 acres south of U. S. Highway 40 include combined freight terminal and office building, shop building, bulk fuel plant and 10 acres of paved parking area.

LOTS OF LATHES—Galigher Co. of Salt Lake City is awarded contract for about $2,000,000 worth of lathes, to be delivered to Hill Air Force Base and other bases in California and south central states.

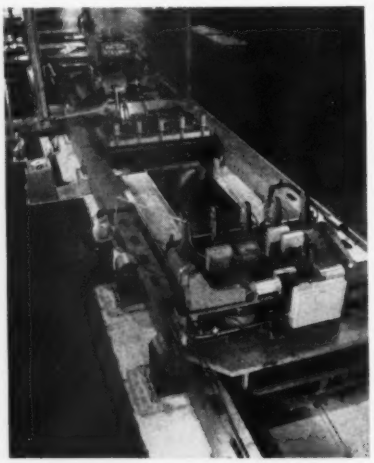
PIPELINE APPROVED — State Public Service Commission approves construction of $100,000 pipeline by Mountain Fuel Supply Co. from Carbon-Emery Counties to Salem and Payson. New line will connect with Clear Creek-Orem transmission line of Utah Natural Gas Co., with whom Mountain Fuel has purchase agreement.

WASHINGTON

YELLOWSTONE PIPELINE—Office of Defense Mobilization grants defense tax benefits on proposed $18,700,000 oil pipeline to be built by Continental Oil Co. and its subsidiary, Yellowstone Pipe Line Co. Other interests in line are Carter Oil Co., Union Oil Co., and H. Earl Clack Co. Construction of 544-mi. oil pipeline from Billings, Mont., to Spokane has been postponed. Originally scheduled for completion by January, bids were prohibitively high because of costs of winter construction. Contractors have been asked to submit new bids on basis of completion late in August 1954.

Permits to build a $1,000,000 terminal in Spokane have been issued by county planning commission: Continental received $500,000 permit for construction of one 2,000-gal. steel storage tank, one 55,000-gal. tank and three 30,000-gal. tanks. Second $500,000 permit, to Yellowstone, covers construction of garage and office buildings, truckloading rack and tank car loading facility. Carter Oil Co., which holds 40% interest in pipeline, will start $1,000,000 program next year for building service stations in Spokane and Inland Empire.

ALLIED ALLOY — Pacific Northwest Alloys, Inc., Mead, may go into ferromanganese production if power is available. No converting of equipment would be required; either a third furnace could be used or the one now making ferrosilicon could be switched to new product. Plant has four electric arc furnaces and is using two of them at present for ferrochrome and ferrosilicon production.



KAISER ALUMINUM STRETCHER—Kaiser Aluminum's new 5,000,000-lb. stretcher recently installed at Trentwood, Wash., rolling mill is shown stretching plate of 75S alloy, strongest aluminum alloy commercially produced. Operation requires 4,000,000-lb. force, 10 hrs. after heat treatment. Production of high-strength aluminum alloy plate permits airframe industry to use machined, integrally stiffened structures, such as large wing panels, instead of sections made up of pieces riveted together. Plate is also used in shipbuilding, chemical and transportation industries. First deliveries from this machine have already been made to aircraft manufacturers.

ANACORTES REFINERY — General contract for construction of Shell Oil Co.'s $75,000,000 refinery at Anacortes is awarded Bechtel Corp., San Francisco. Field construction will begin in mid-1954, but clearing and grading of 700-acre site will get under way soon, followed by construction of drainage facilities, roads, wharfs and temporary buildings. Much of this work will be sub-contracted by Bechtel Corp. to local firms. Major units of 50,000-bbl. refinery will be crude oil fractionating unit and platformer, scheduled for completion in mid-1955, and catalytic cracker, by end of 1955. Units will be put into operation as completed. Bechtel Corp. is in charge of employment of construction force, which at its peak will number about 1,500 men.

Anacortes City Council has retained Seattle engineering firm of Carey & Kramer to study problem of supplying water to refinery. Final report of consultants will be submitted around November 1.

RHEEM IN TACOMA — Rheem Mfg. Co., Richmond, Calif., will build plant in Tacoma on 15½ acres in a waterfront industrial area purchased from Port of Tacoma for $59,794. Firm, which manufactures steel products such as furnaces, ranges and hot-water heaters, reportedly may supply materials for construction of a proposed oil products refinery at Tacoma.

WYOMING

RULE ON GRASS CREEK — Wyoming Public Service Commission defines areas to be serviced by Mountain States Power Co. of Casper, and Hot Springs Rural Electric Cooperative, Inc., of Thermopolis, and permits construction of $150,000 three-phase power line by Mountain States to serve Grass Creek oil field. Power line, which will transmit power to 70 to 100 oil wells and several pipeline pumping plants, is expected to be completed within the next two months.

TO ABANDON LINE — Montana-Dakota Utilities Co. applies to Wyoming Public Service Commission for authority to abandon portion of pipeline from Little Buffalo basin gas field which serves towns of Basin and Greybull. Company seeks to replace this service by constructing short lines that will connect stations at Basin and Greybull to high-pressure Worland line.

INTRASTATE USE—Use of Platte Pipe Line Co.'s new line to Wood River, Ill., which in Wyoming runs from Chatham to Yoder, is approved for intrastate commerce, according to order by Wyoming Public Service Commission. Refineries in Casper, Glenrock and Cheyenne will now be able to use crude oil of Big Horn basin, through connecting Rocky Mountain pipeline at Guernsey.

8-INCH PIPELINE—Plains Pipeline Co., Newcastle, applies to Wyoming Public Service Commission for authority to build $660,000 eight-inch oil pipeline from Clareton oil field in Weston County to company's terminal at Lance Creek oil field.

Enter this Lyon Den with Confidence

There are two big reasons why your Lyon Steel Equipment Dealer is a good man to know.

First, a highly diversified line of more than 1500 standard Lyon items enables him to meet the varying needs of business, industry and institutions — *better.* (A very few typical Lyon products are shown below.)

Second, he's a source of sound counsel in getting the most out of steel equipment in terms of savings in time, labor and money.

Lyon also has complete design and production facilities for special contract work.

LYON METAL PRODUCTS, INCORPORATED

LOS ANGELES	SAN FRANCISCO	PORTLAND	SEATTLE	SPOKANE
3650 Union Pacific Ave.	607 Market Street	P. O. Box 3797	1755 Utah Avenue	614 Peyton Bldg.

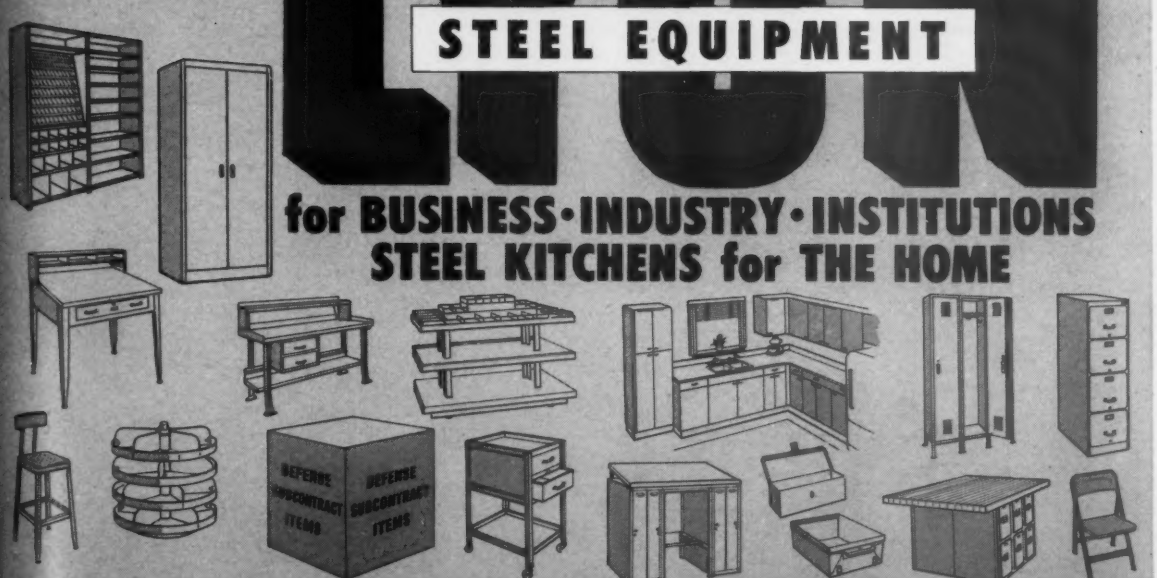
Shipment from Pacific Coast Points

General Offices and Main Factory: 1040 Monroe Avenue, Aurora, Illinois

LYON®

STEEL EQUIPMENT

for BUSINESS • INDUSTRY • INSTITUTIONS
STEEL KITCHENS for THE HOME



A PARTIAL LIST OF LYON STANDARD PRODUCTS

• Shelving	• Kitchen Cabinets	• Tool Toters	• Economy Locker Racks	• Display Equipment	• Filing Cabinets	• Service Carts	• Tool Stands
• Lockers	• Cabinet Benches	• Bar Racks	• New Freedom Kitchens	• Flat Drawer Files	• Folding Chairs	• Sorting Files	• Shop Boxes
• Stools	• Storage Cabinets	• Tool Boxes	• Toolroom Equipment	• Revolving Bins	• Work Benches	• Drawer Units	• Tool Trays
• Bin Units	• Drawing Tables	• Parts Cases	• Wood Working Benches	• Hanging Cabinets	• Bench Drawers	• Hopper Bins	• Shop Desks

POSTMASTER:
"Form 3547 Requested"
WESTERN INDUSTRY
609 Mission Street
San Francisco 5, Calif.

Acceptance under
Section 34.64 P. L. & R.
Authorized

Maintaining a 10-Year Flow

OF STARCH AND DEXTRINE

REDLER conveyors and elevators, some of them 10 years old, are used at this plant to handle bulk starch and dextrine. Sealed dust-tight REDLER casings insure purity of product and prevent loss by spillage. Compact REDLER casing requires minimum space, and flexible conveyor-elevator arrangements permit a handling system that will meet any plant's specific needs.

The success of REDLERS at this plant is evidenced by the increasing number of units being put into service.

A REDLER bulk handling system may be the ideal, low-cost-per-ton answer to your plant's handling problems. Whether you plan an entirely new or a revised plant layout, check on the REDLER advantages. Ask for an S-A engineer's recommendation ... there's no obligation, so do it today.